

modern machine shop

FEATURES IN
BRIEF

See Page 2

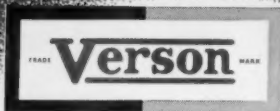
WORKER
SAFETY

See Page 102

MACHINING
JET DISCS

See Page 118

AUGUST 1957

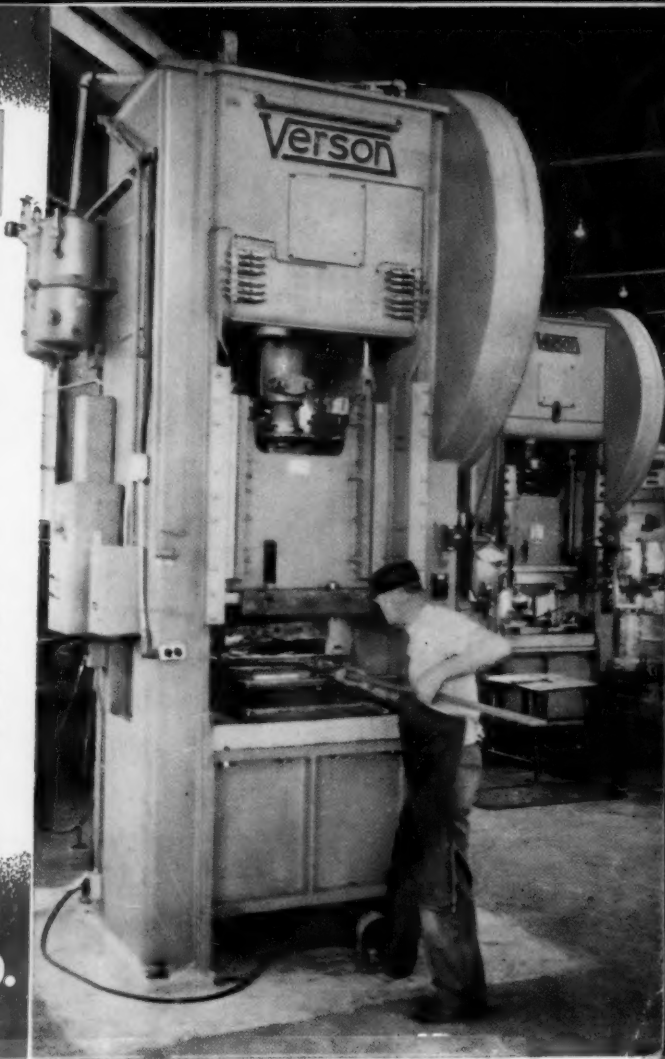


STRAIGHT SIDE PRESSES

provide
the versatility
necessary
for short run
production

The H & L Tooth Company, Montebello, California, uses these two Version 150 ton crank presses for blanking, shearing, punching and bending $\frac{1}{2}$ " to 1" alloy steel plate in the manufacture of a variety of digging teeth for excavation equipment.

VERSION
ALLSTEEL PRESS CO.
Chicago and Dallas



Drills 417 holes
at one time.

How to keep hydraulic equipment in tune

The multiple-spindle machine, shown above, is used in the production of cast iron harps for pianos. It drills 417 holes at one time — from 5/32" to 7/16". The large number of spindles makes lubrication a critical factor in keeping production humming.

That's why the machine manufacturer — Zagar Tool, Inc., Cleveland, Ohio — specifies *Texaco Regal Oil R&O* both as a spindle lubricant, and in the hydraulic system which controls the feed of the drills.

Texaco Regal Oil R&O has

much greater oxidation resistance than ordinary turbine-quality oils used in hydraulic service. It effectively prevents rust and foam — assures smoother, more dependable service.

There's a complete line of *Texaco Regal Oils R&O*. Let a Texaco Lubrication Engineer help you select the one best for your job. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Regal Oils R & O
FOR ALL HYDRAULIC UNITS

M. L. FORNEY, *Publisher*
 RICHARD S. KLINE, *General Manager*
 FRED W. VOGEL, *Editor*
 HOWARD CAMPBELL, *Editor Emeritus*
 ROBERT I. SHORE, *Managing Editor*
 GILBERT C. CLOSE, *Field Editor*
 ALFRED M. COOPER, *Contributing Editor*
 NORMAN S. ROGERS, *Art Editor*
 M. C. DUE, *Editorial Assistant*

modern machine shop

Vol. 30 No. 3 August, 1957

FEATURES IN THIS ISSUE

- 102** Safety On and Off the Job • *By Alfred M. Cooper*
- 114** Fabricating Rotor Hubs • *By Harry A. Meyer*
- 118** Machining Jet Discs • *By Ira S. Roberts*
- 122** Manufacturing Blower Wheel Cages • *By Bartlett West*
- 124** TV Aids in Huge Die Production
- 126** Cost-Saving Setup for Assembling Pepper Mills • *By Howard Wulfig*
- 134** Know Your Tool Signatures • *By R. J. Moessner*
- 140** Machining Stainless Steel • *By G. J. Stevens*

**TURN PAGE
FOR DETAILS**

IDEAS FROM READERS

- 144** "Fishtail" Drill for Sheet Metal • *By H. J. Gerber*
- 145** Simple Knockout Device for Tapered Shank Tools • *By Richard Minser*
- 145** Methods for Facilitating Handling of Heavy Dies • *By Buckley Sullivan*
- 146** Spring Checking Fixture • *By Clifford Molloy*

DEPARTMENTS

- | | |
|---------------------------------------|------------------------------------|
| 48 Important Meeting Dates | 166 News of the Industry |
| 53 Advertising Representatives | 204 New Shop Equipment |
| 92 Over the Editor's Desk | 322 "Where to Get It" |
| 156 New Literature | 332 Index to Advertisements |

Member



SAFETY ON AND OFF THE JOB

By Alfred M. Cooper

In this timely and enlightening article, the author clearly points out how an industrial worker who is killed or injured off the job is just as much a loss to his company as though he had become a casualty on the job.

Page 102

**WELDED AND SPUN STEEL DESIGN USED
IN FABRICATING ROTOR HUBS**

By Harry A. Meyer

Through a unique combination of automatic arc welding and spinning operations, effective reductions in cost and weight, better performance characteristics and enhanced appearance have been realized in the redesign of rotor hubs for small industrial fans or blowers.

Page 114

MACHINING JET DISCS

By Ira S. Roberts

Newly developed center drive trace lathe eliminates "bottleneck" in the production of jet engines by considerably speeding up the machining of compressor and turbine discs.

Page 118

MANUFACTURING BLOWER WHEEL CAGES

By Bartlett West

By closely integrating high-speed stamping and resistance welding operations, a leading air conditioning manufacturer is able to turn out up to 150 blower wheel cages per hour.

Page 122

n this issue

AUGUST 1957 • VOL. 30 • No. 5

TV AIDS IN HUGE DIE PRODUCTION

A special die-layout machine installed at the Aluminum Company of America's Cleveland Works takes advantage of television to achieve push button-controlled accuracy in laying out various types of forging dies.

Page 124

COST-SAVING SETUP FOR ASSEMBLING PEPPER MILLS

By Howard Wulfigg

The cost of producing pepper mills at The George S. Thompson Corporation, manufacturer of the famous Olde Thompson line of gifts and accessories, has been reduced by 11 cents on each pepper mill produced through the use of a unique setup comprising a hydraulic press equipped with simple interchangeable tooling.

Page 126

KNOW YOUR TOOL SIGNATURES

By R. J. Moessner

According to the author of this informative article, premature cemented carbide tool failure can be greatly minimized by proper tool geometry. As an aid in assuring proper tool geometry, a tool signature table is included with the text.

Page 134

MACHINING STAINLESS STEEL

By G. J. Stevens

This case history points out how difficulties were eliminated in tapping a blind hole in a Type 303 stainless steel part.

Page 140

modern machine shop

rolling taper pipe threads

with the LANROLL thread rolling attachment

Thread-roll wear is minimized by the recently developed LANDIS Method (Patents Pending) for precision rolling of taper pipe threads (including dry-seal).

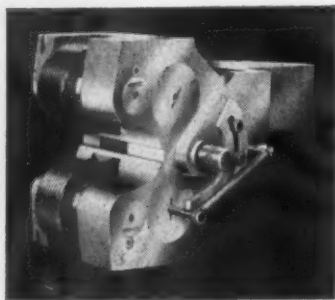
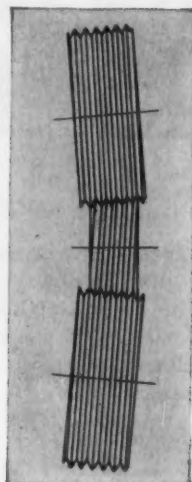
To produce the taper, the rolls of the LANROLL Attachment are supported on carbide shafts inclined to the required thread taper. This design enables the use of parallel rolls (see drawing) which reduces slippage between the workpiece and the rolls. With reduced slippage, roll life is materially increased. In addition, attachment stabilization (limited sidewise movement) is greatly improved to permit rolling directly to a shoulder with safety.

Either straight or tapered threads can now be produced with the same attachment through the use of proper rolls and auxiliary equipment. Five sizes with varying dimensions are available for use on the many sizes and makes of bar automatics, and will produce coarse pitch

threads to Class 4 tolerances on all diameters from #5 to 1-3/4" for straight threads, and precision pipe threads from 1/16" to 1-1/4" in diameter.

In addition to proper rolls, the auxiliary equipment necessary to change from straight to taper threading is negligible. When changing from one pipe size to another within the range of the attachment, the size adjusting link, set-up gage and rolls are the only equipment changes required. With this design tooling flexibility is obtained with minimum cost. These changes assure operation of the attachment for every size within its range as though it were exclusively engineered for the particular work being threaded.

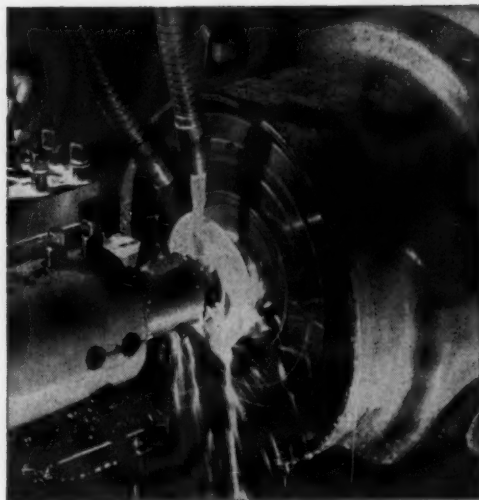
Ask for Bulletin G-96.



LANDIS Machine COMPANY
WAYNESBORO • PENNSYLVANIA • U. S. A.

For more data circle 305 on Reader Service Card

472



Improved
Lusol STEPS UP
PRODUCTION

Oil-free, transparent, water-soluble Lusol has the highest heat removing capacity of all coolants, regardless of type. It keeps tools cooler so cutting edges last longer, keeps work pieces cooler so closer tolerances can be maintained. No smoke, no odors, no oily floors, no dermatitis—it adds up to better production every time.



F. E. ANDERSON OIL COMPANY INC.

BOX 216, PORTLAND, CONNECTICUT

**PROOF THAT LUSOL
LOWERS COSTS
IMPROVES PRODUCTION**

THE WORK: Tapping and threading 1" x 14" bolts.

MATERIAL: 1018-1020 Steel, Alloy Steel, and some Stainless Steel.

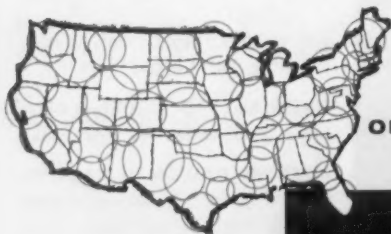
COST PER GALLON IN MACHINE: Lusol, approx. 27¢; former coolant (cutting oil), approx. 50¢.

TOOL LIFE: Approx. 2-1 over previous coolant.

While running with oil, entire dept. was filled with smoke, and pieces were so hot they had to be removed with tongs. Lusol eliminated smoke entirely and pieces can be removed by hand.

For more data circle 306 on Reader Service Card

Precision + Interchangeability



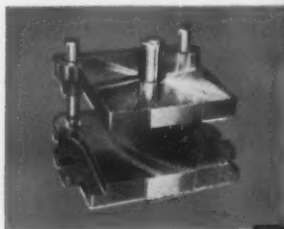
= Availability

ON **NEW** DANLY DIE SETS

Danly leadership in die set distribution is made possible by the precision with which Danly sets are made. Precision makes Danly die set components completely interchangeable . . . parts can be stocked by branch assembly plants or distributors throughout the country and assembled for delivery in any of thousands of combinations as standard die sets to meet specific tooling needs. No matter where you are, from New England to California, you get the same Danly precision, the same broad selection, the same fast service.



Inspection stations like this, at every critical stage of production, maintain Danly's traditional accuracy.



Leading industrial distributors and Danly branch assembly plants—located in all major tooling centers—stock Danly Die Sets for fast delivery.

**DANLY MACHINE
SPECIALTIES, INC.**



2100 South Laramie Avenue
Chicago 50, Illinois

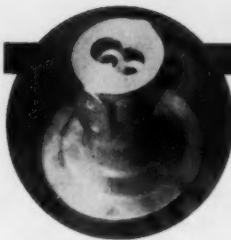
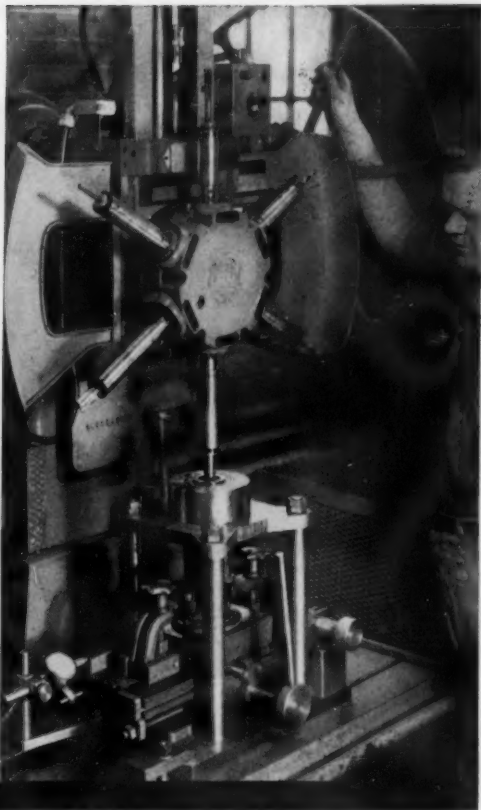
**"Our BURGMASTER® turret drill
saves 43% running time
over turret lathe"**

Graymills Corporation, Chicago

states "two things make operations on the gear pump body casting somewhat unusual.

(1) gear pockets are *bored* to close tolerances; (2) *both* pocket and shaft holes are machined on different centers by shifting the casting approximately $\frac{3}{4}$ " in the fixture.

The setup, as worked out on our Burgmaster equipped with Power Feed, (see illustration) is producing much more accurate pieces with fewer rejects. Our running time is 57% of that on the turret lathe and we have been able to release the much more expensive lathe for other work. In addition, the Burgmaster is much easier to operate."



*Sequence of operations on 6-spindle Burgmaster turret drill
is as follows:*

1 Load	9 Counter bore—rough 2nd gear pocket
2 Counter bore—rough 1st gear pocket	10 Bore—finish 2nd gear pocket
3 Bore—finish 1st gear pocket	11 Skip
4 Drill—rough $\frac{1}{2}$ " shaft hole	12 Drill—rough $\frac{3}{8}$ " shaft hole
5 Skip	13 Skip
6 Ream—finish $\frac{1}{2}$ " shaft hole	14 Ream—finish $\frac{3}{8}$ " shaft hole
7 Skip	15 Unload
8 Shift fixture—hold tolerances by using dial indicator	

Note arrangement of tooling sequence. By skipping stations, machining of the entire piece and shaft holes of two different sizes is possible. Depth is controlled by the standard Burgmaster micro-steps. All dimensions are $\pm .0005$ ".

For complete information, write Dept. MM-8



BURG TOOL

Manufacturing Company, Inc.

15001 South Figueroa Street, Gardena, California

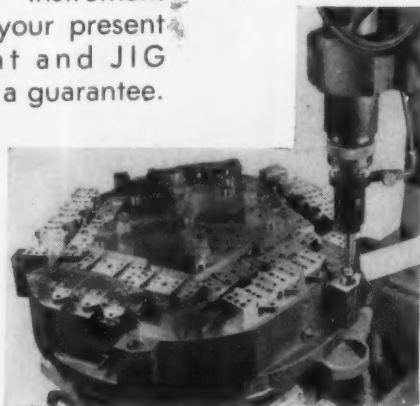
RIDGEWOOD, N.J. • CHICAGO • CLEVELAND • DETROIT • SAN LEANDRO, CALIF.

For more data circle 308 on Reader Service Card

H LES JIG GROUND with

Vulcanaire

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton). Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result — eliminated all close locating and dowelling of individual parts and of course hours of time.

*Vulcanaire equipment pays for itself on the first job.

Borrow our instructive 11 minute movie on Jig Grinding.

Services { ENGINEERING . . . PROCESSING . . . BUILDING . . . SPECIAL
MACHINES . . . VULCANAIRE JIG GRINDERS . . . MOTORIZED
ROTARY TABLES, BREHM SHIMMY AND RELATED DIES.






VULCAN TOOL CO. {YOUR TOOL ROOM IN DAYTON}
710 LORAIN AVENUE • DAYTON 10, OHIO



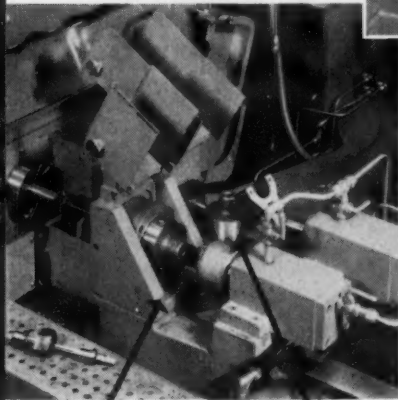
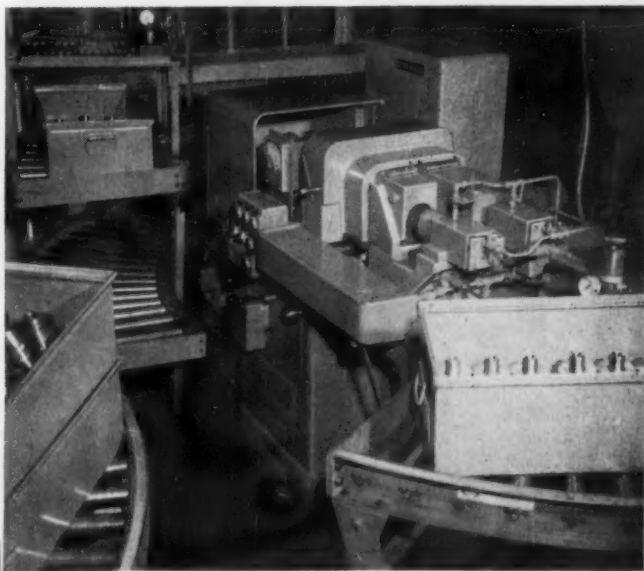
For more data circle 309 on Reader Service Card

GUN DRILLING on a Bore-Matic gives SURE-FIRE PRODUCTION

with

-  higher precision
-  better finish
-  easier operation
-  less maintenance
-  lower costs

Model 121 Bore-Matic equipped for gun drilling is positioned in a conveyorized production line. Left foreground conveyor brings work to operator and lower background conveyor takes it to intermediate operations. Right foreground conveyor returns work for second gun drilling and upper background conveyor takes pieces away.



FRONT STATION—Gun drill plunger hole from solid. Coolant is confined inside part, after drill breaks through, by Neoprene tip on hydraulic clamping head.

REAR STATION—Gun drill port hole from solid. Holes are plugged to confine pressure (750 psi) coolant inside work after drill breaks through.

THE PRECISION and speed of a Bore-Matic make it a natural for gun drilling. For example, the two-station Model 121 shown here was fitted with adapters to hold the gun drills on the boringhead spindles and with hydraulic clamping heads mounted on the table for the mating bushings. It replaced a two-spindle gun drilling machine for handling the plunger and port holes in Nitralloy hydraulic heads. Here are the results:

PRODUCTION was increased from 24 to 27 parts per hour for plunger hole. Port hole production—previously done on drill press with final location by subsequent grinding of shoulder—went up to 48 parts per hour with accurate location.

TOLERANCES were reduced from .002 to .001. Both holes straight within 20 to 30 millionths.

FINISH was improved from 60 rms to 15 rms; and honing was eliminated.

OPERATIONAL handling time was cut in half.

MAINTENANCE was substantially reduced.

COSTS were cut by 75% over previous method.

Another plus factor was that the closer tolerances resulted in great savings in subsequent operations.

For more information on this and other interesting and profitable set-up possibilities with a Bore-Matic, get in touch with your nearest Heald representative.

IT PAYS TO COME TO HEALD!

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

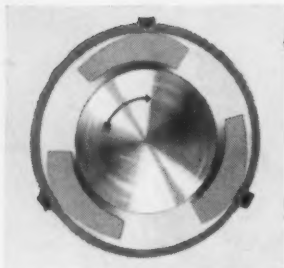
Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

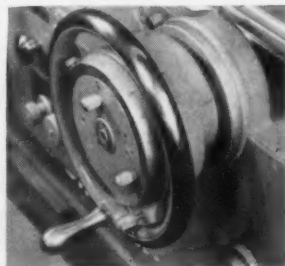


For more data circle 310 on Reader Service Card

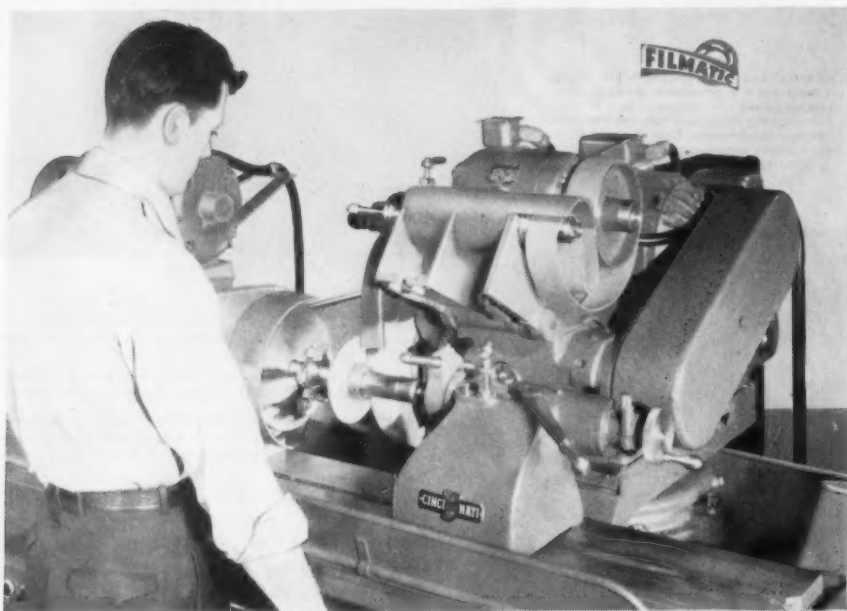
These Cincinnati keep your setup from showing



FILMATIC Self-adjusting grinding wheel spindle bearings



Two-speed cross traverse handwheel

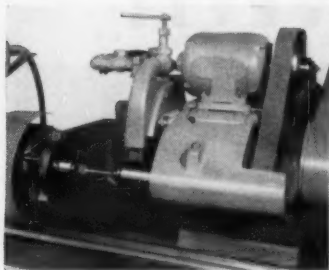


Grinding close to the shoulder. **CINCINNATI** Universals consistently reverse within .004"; save time by eliminating manual "touch-up."



CINCINNATI

timesavers on the cost record



Hinge mounted internal grinding unit

Dial selection of headstock spindle speeds



Small manufacturing quantities are tough on costs. In precision toolroom grinding, CINCINNATI® FILMATIC Universals offer several ways to eliminate or greatly reduce the setup element of cost.

FILMATIC grinding wheel spindle bearings require no adjustment for any degree of finish.

Two-speed cross feed mechanism facilitates quick positioning of wheelhead for multiple diameter grinding; incorporates pickfeed all the way to final size.

Internal grinding unit is hinged at the front of the wheelhead casting, always ready for internal work.

Instant work speed selection for the diameter being ground. Just turn the dial with one hand.

Power rapid positioning of wheelhead. Saves time and energy when setting up for widely varying diameters (extra equipment).

Other ways in which CINCINNATI FILMATIC 12", 14", 18" Universal Grinders can reduce costs in your shop are outlined in catalog No. G-663-1. May we send a copy to you? Brief specs in Sweet's.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO



Power positioning of wheelhead

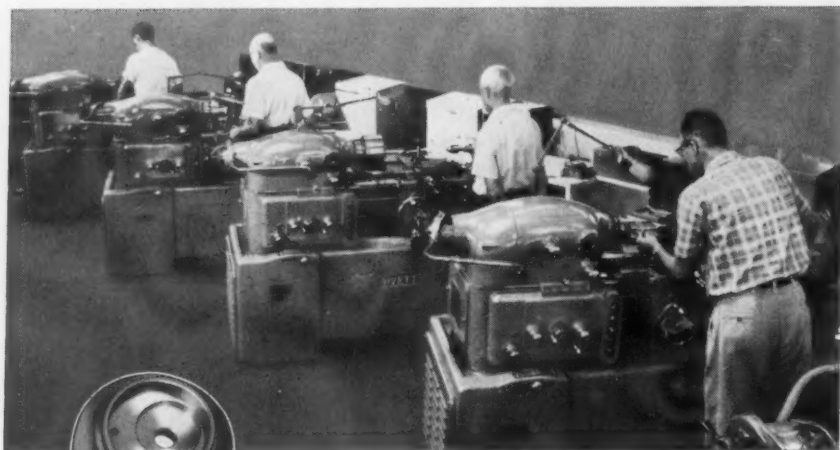


CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • ROLL GRINDING MACHINES • SURFACE GRINDING MACHINES • CHUCKING GRINDERS • MICRO-CENTRIC GRINDING MACHINES • CENTERLESS LAPPING MACHINES

For more data circle 312 on Reader Service Card

DAYSTROM
Electric Corp.

—puts it on a
RIVETT!



Brass piece with off-center counterbore and through-hole completely machined on a 1020S Rivett.

Machined on a 1020S from 4140 steel after tempering at a Rockwell hardness of C20-25.

Battery of Rivett 1020S Lathes in the Research and Development Division of Daystrom Electric Corporation, Poughkeepsie, N. Y.

Productivity!

Daystrom machines model parts with an eye to normal manufacturing methods. For this reason Daystrom highlights an important Rivett feature—productivity—in its statement:

"We have found that the Rivett 1020S Lathe is one of the most useful and all around productive machines in our model shop, and is so constructed that

it is relatively easy for an average operator to obtain the dimensions and finish necessary in our work."

"Model work requires holding concentricity to .001" T.I.R. between several diameters; turning is often held to several tenths. And, a finish of 32 micro inches and better is easily obtained!"

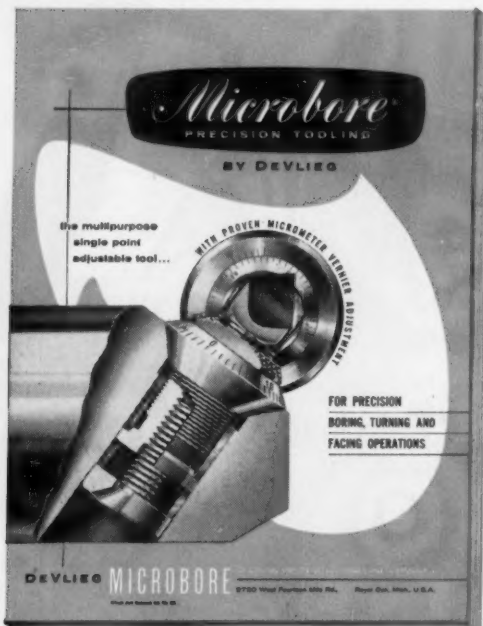
RIVETT LATHE & GRINDER, INC.
Dept. MMR-8
Brighton 35, Boston, Massachusetts

Inquire about the 1020 Toolroom Precision Lathe now. Write for 16-page catalog and name of nearest dealer.



For more data circle 313 on Reader Service Card

now a completely new DeVlieg Microbore Catalog
listing **332** standard
general purpose boring bars

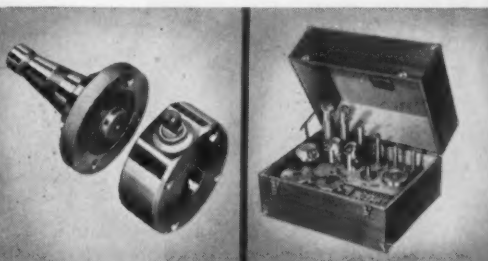
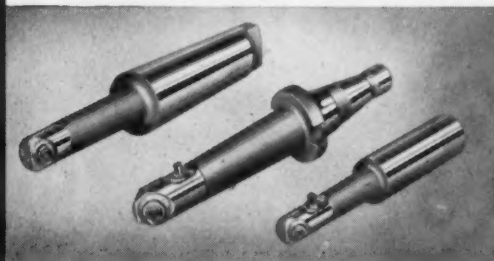


... FOR USE ON ALL MAKES
AND TYPES OF BORING MACHINES,
MILLING MACHINES AND
TURRET LATHES!

Yes sir, you'll find it a constant aid.
The new descriptive Microbore Catalog
No. 58 presents a comprehensive range of
newly designed Standard Single Tool
and Two Tool Boring Bars, Boring Bar
Sets and accessories. It also includes
complete application, dimensional and
carbide data.

Unique flip charts with simple engineering
illustrations make it fast and easy to
select the correct Boring Bar with
NMTB Taper, Morse Taper or Straight
Shank for a specific application.

STANDARD MICROBORE BORING BARS, BORING RINGS AND BORING RING ADAPTERS ARE AVAILABLE SINGLY OR IN SETS



MAIL THIS COUPON TODAY

DeVlieg Microbore

DIVISION OF DEVLIEG MACHINE COMPANY

2720 West Fourteen Mile Rd., Royal Oak, Michigan

Please send me a copy of your new Microbore Catalog No. 58.

Name _____

Company _____

Title _____

Address _____

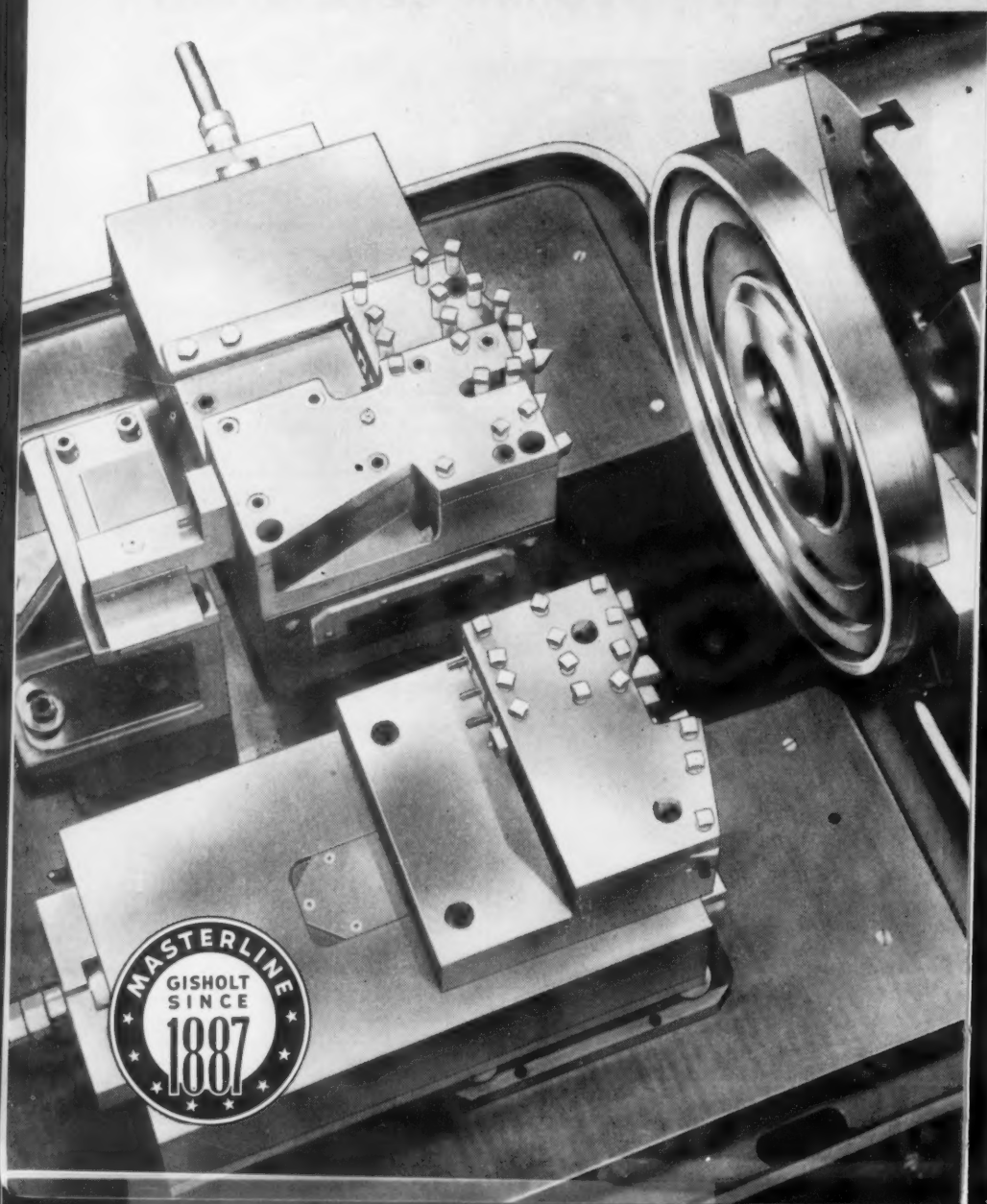
City _____

Zone _____

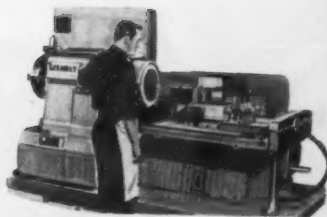
State _____

For more data circle 314 on Reader Service Card

This New GISHOLT MASTERLINE[®]
SIMPLIMATIC AUTOMATIC LATHE *may save you*

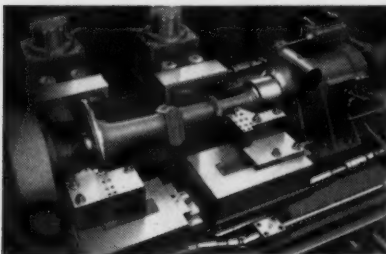


the cost of a special machine



HERE'S WHY: the machine itself—headstock, bed, extra wide platen table—is *standard!*

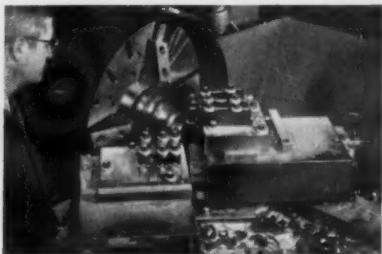
Yet with the new Gisholt MASTERLINE Simplimatic Automatic Lathe, you have ample space for an *infinite* number of slide and tool arrangements. You can use front, center, rear and auxiliary slides—all moving at different feed rates—carrying enough tools to machine a maximum number of surfaces in a single chucking. All slides are easily mounted at correct angle to the work—keeping tool overhang to absolute minimum for increased rigidity and increased accuracy. And with the Simplimatic's table feed, tools can engage with the work or perform additional machining operations before actual slide movements begin.



Simplimatic setup for machining both ends of tractor rear axle housings in one chucking. Four tool slides are used, two at the front and two at the rear of the platen table. Machining includes turning and chamfering, forming and straddle-facing, with tool relief provided for facing tools on the rear tool blocks.

Because the Gisholt Simplimatic is a standard machine, it is *easy* to set up, operate and maintain. In many cases, the automatic cycle frees the operator to handle additional units or perform other work. And the basic design is readily adapted for work-handling devices, which even further simplify the operator's job and speed production!

Ask your Gisholt Representative to show you how efficiently the Simplimatic can handle your problem parts—using a simple, standard machine transformed by addition of standard tool slides, tool blocks and chucking equipment—performing *special* machine functions at *standard* machine prices! Call him today for full information on the Simplimatic!



Six different sizes of tough steel oil well cutter bits are handled easily, efficiently by this setup. All slides and tools are placed at correct angle to the work. Tools are mounted on riser plates, permitting pre-setting for quick change-over and adjustment. Rigid support prevents chatter on heavy forming cuts.

READY NOW! Write today for new Catalog 1159-A on Gisholt MASTERLINE Simplimatic Automatic Lathe. Fully illustrated—shows 31 typical jobs.



GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

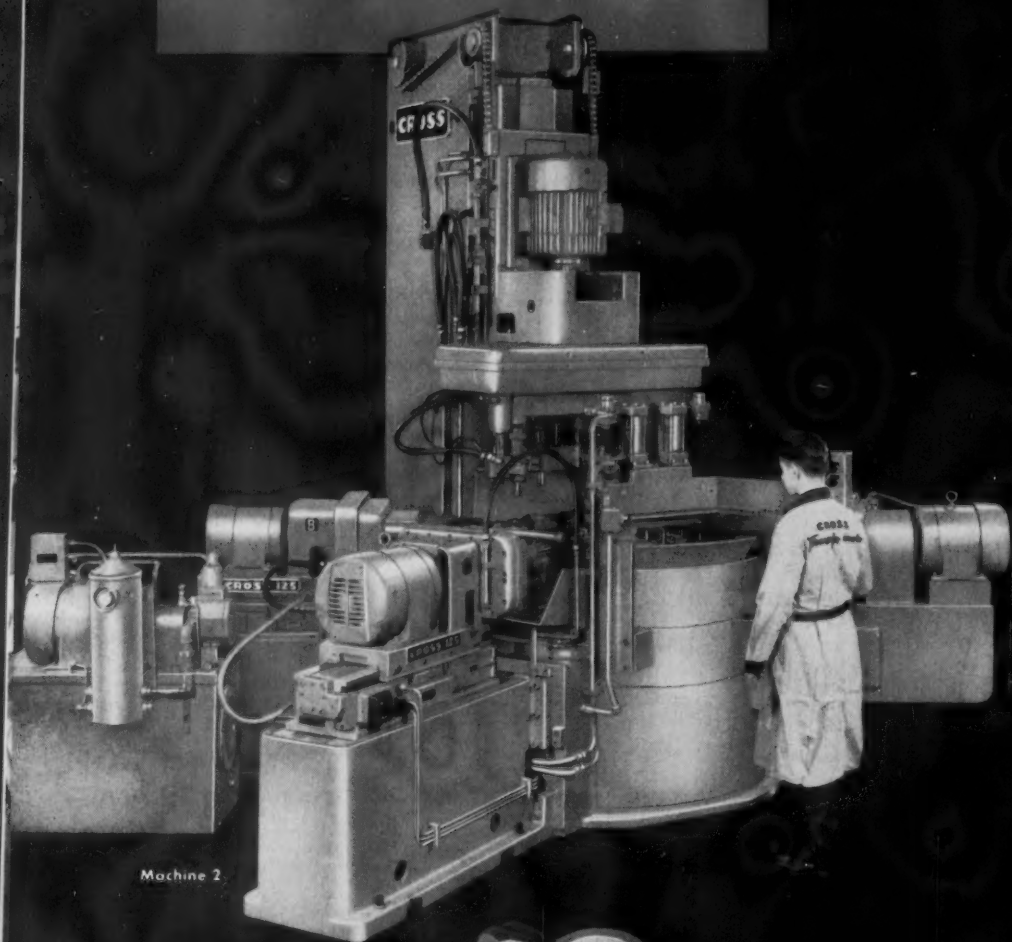
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

For more data circle 316 on Reader Service Card



More Specials by Cross

Two Dial Type Machines Process Valve Rocker Arms



Machine 2



Established 1898

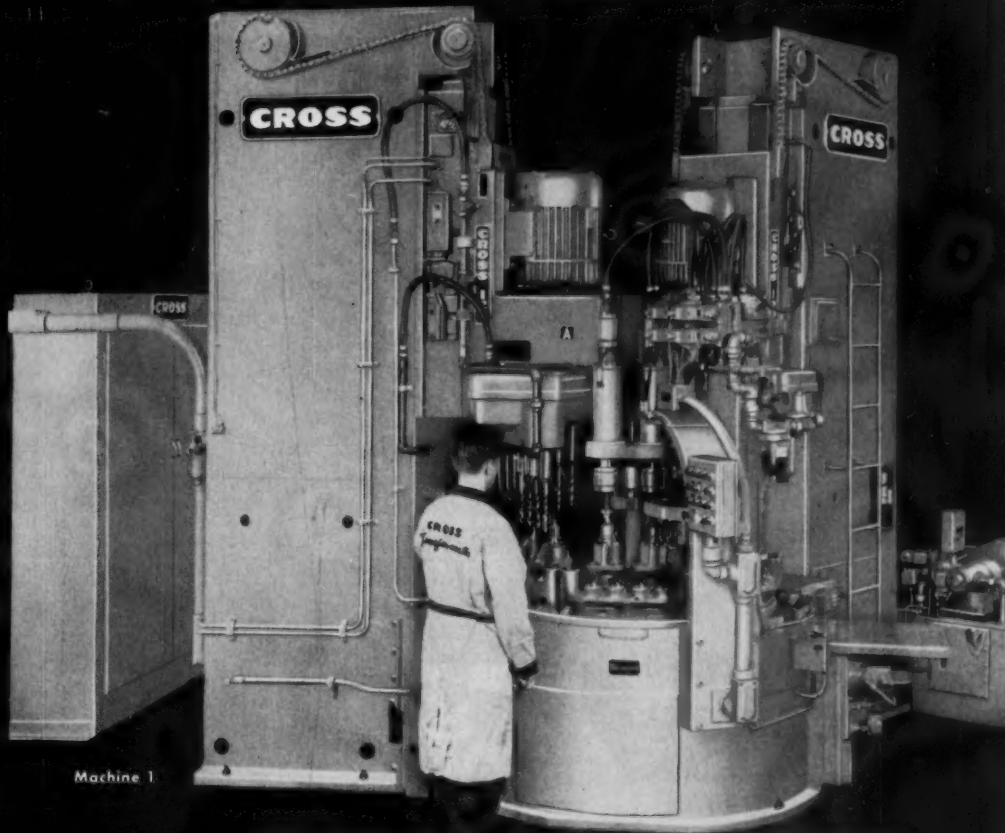
THE **CROSS** CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

Another

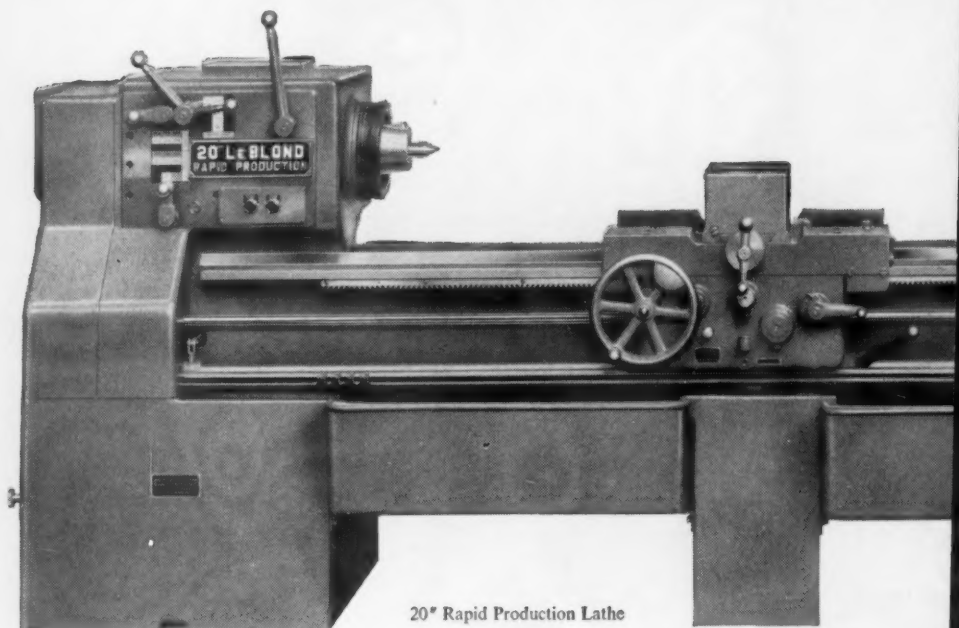
More Specials by Cross



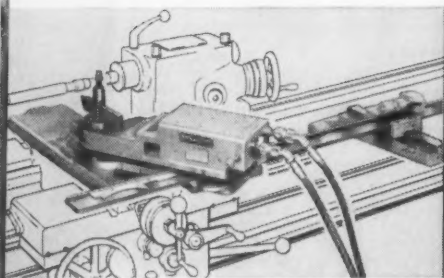
Machine 1

- ★ 800 pieces per hour at 100% efficiency.
- ★ Four parts machined in each station.
- ★ Machine 1 drills and reams rocker shaft hole; forms oil groove; drills one oil hole. Machine 2 drills, chamfers and taps adjusting screw hole; drills, counterdrills and spotfaces second oil hole.
- ★ Push button controlled power wrenches operate fixture clamps.
- ★ Cross "building block" construction provides flexibility for part design changes.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Other features: Construction to JIC standards; hardened and ground ways; hydraulic feed and rapid traverse for drilling and reaming; individual lead screw feed for tapping; automatic lubrication; pre-set tooling throughout.

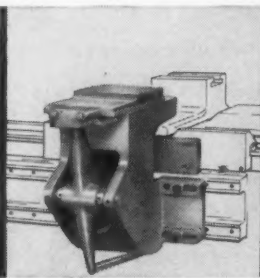
Another ALLNEW



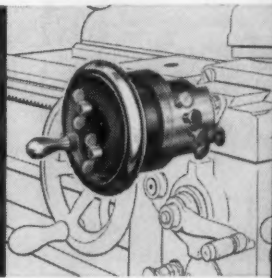
20" Rapid Production Lathe



HYDRA-TRACE®. LeBlond's exclusive hydraulic duplicating attachment can be installed in minutes. For stepless form turning, contour facing, turning step shafts, etc. Transforms the Rapid Production into the most economical Tracing Lathe in its class!



Automatic Facing Attachment. Permits two simultaneous operations from front and rear. While straight turning with front tools, attachment faces automatically using rear tools.



Multiple Positive Cross Feed Stops, Style B. Used for facing steps and duplicating diameter settings. Four adjustable stops are built into cross feed bushing. Will perform repetitive work accurately.

LEBLOND

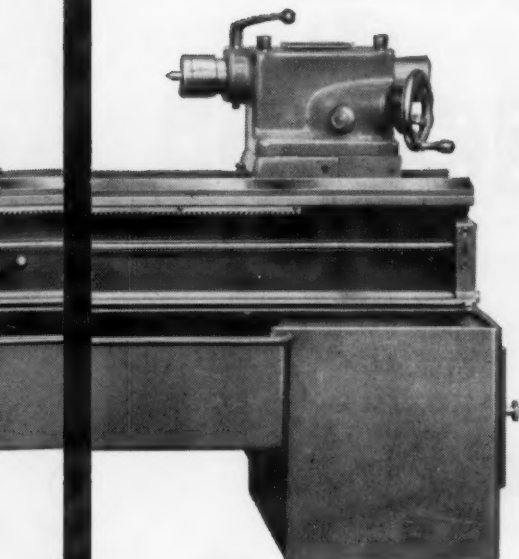
Low-cost manufacturing lathes with custom features to suit your specific turning jobs

Design your own manufacturing lathe—with the features and attachments you want. No extras to buy, only what you really need to do your job!

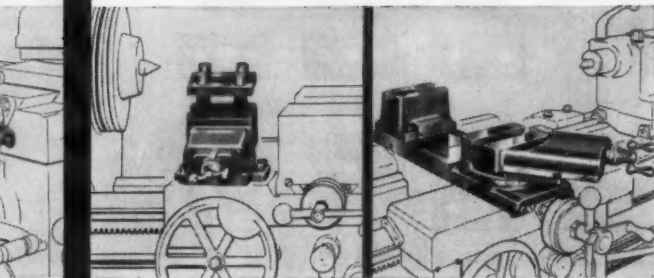
Here's how it works: The basic machine is either the new 17" or 20" LeBlond Rapid Production Lathe, designed from the ground up specifically for manufacturing assignments. They are *not* stripped down engine lathes. They *are* fundamentally simple, so that you can add the features you want. Ruggedly built, too, with all the basic LeBlond construction that assures dependable performance for many years.

From there on, it's your decision. First—your choice of speed ranges. On the 17", 70 to 700 rpm or 105 to 1050 rpm. On the 20", 57 to 600 rpm or 85 to 900 rpm. Next—your choice of any or all of these specific features: Hydra-Trace® hydraulic tracing, automatic facing, air-operated chucks, quick-acting tailstock, connected rests, taper attachments, turret tool post, cross and length stops, many more.

You'll find that with these custom features, you can design exactly the lathe you need to give you maximum production capacity per dollar investment. A lathe precisely suited to your manufacturing needs! Before you buy a manufacturing lathe, be sure to check the new LeBlond Rapid Production Lathes. Ask your LeBlond Distributor or write for Bulletin RP-220E.



...cut with confidence



Full Swing Rests. Makes full use of swing capacity over carriage wings for turning large diameter work. May be used with the compound rest for double-diameter turning on large gears, pulleys, etc.

Compound and Plain Connected Rest. Permits one-time set up for turning and facing step shafts. Rear facing tool operates alternately with front turning tool, without tool changing.



**The R. K. LeBlond Machine Tool Company
Cincinnati 8, Ohio**

*World's Largest Builder of a Complete Line of Lathes
For More than 70 Years*

For more data circle 320 on Reader Service Card

Natco Naturals

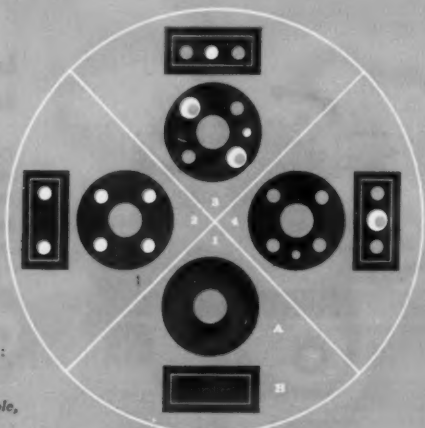
Cost-Cutting Ways

You Can Use

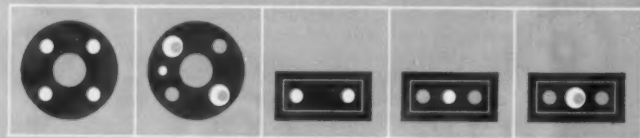
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole—drill, bore, face or tap—it may well be a "Natco Natural."* Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

Multiple Drilling Operations on Two Part-faces



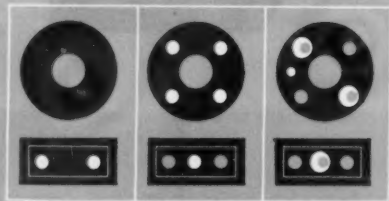
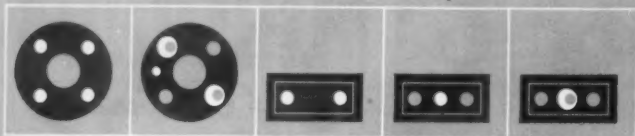
130 parts per hour—4-position rotary table. POSITION #1: Unload finished part, transfer half-finished part, load new part. POSITION #2: Drill 4 holes, Face A. Drill and countersink 2 holes, Face B. POSITION #3: Drill 1 hole, ream 2 holes, Face A. Drill 1 hole, Face B. POSITION #4: Trepan 1 hole, Face B.



65 parts per hour—stationary fixture with 5 work locations. Operator transfers parts after each stroke. One part completed per stroke.

40 parts per hour—straight-line indexing. After every 3 strokes, operator unloads finished part, transfers half-finished part and loads fresh part.

23 parts per hour—tumble-type fixture. Operator transfers and tumbles fixture from one position to the next. One part completed every five strokes.



Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 50 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms of bored slip plates



National Automatic Tool Company, Inc.

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.



5 Basic Reasons why **MARVEL HACK SAWS** **CUT-OFF MORE ACCURATELY...**

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Sawing System that makes it the most accurate cutting-off method you can use are:

1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting load with no deflection or side movement.

2. Anti-Friction Bearing Construction

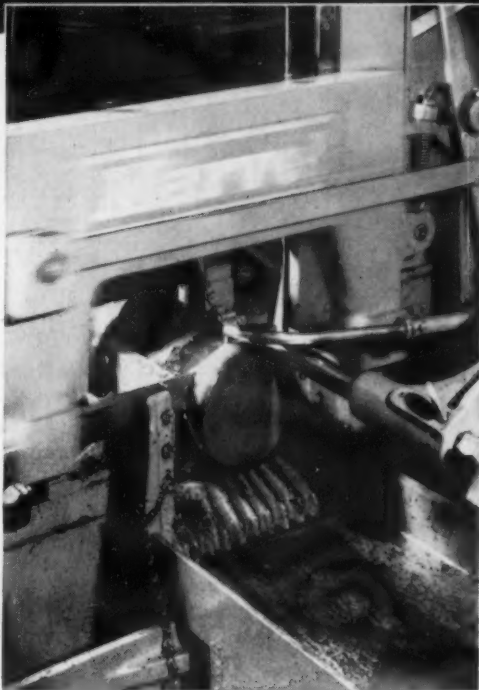
Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.



5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

Write for the MARVEL Catalog and the complete story on
MARVEL METAL CUTTING SAWS

PS-1305



ARMSTRONG-BLUM MFG. CO.
5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

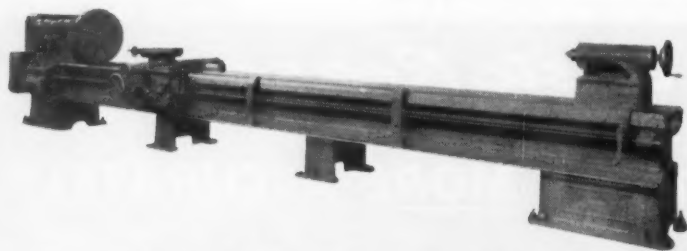
For more data circle 322 on Reader Service Card



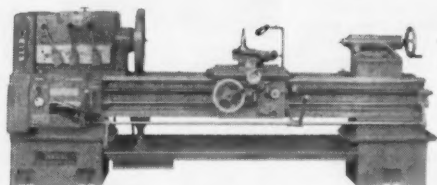
Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

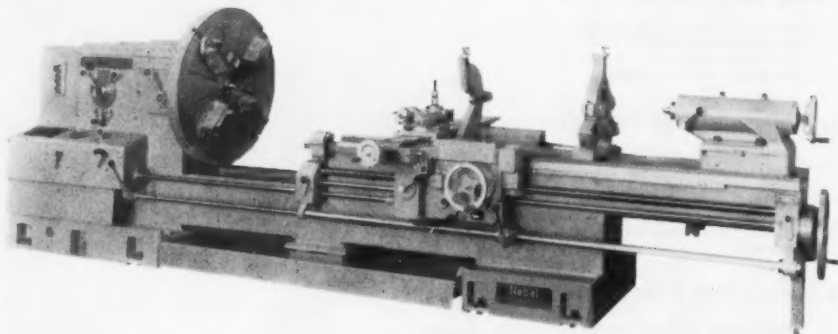
Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.



need a 40" lathe? what's the cost?



use a 20" lathe, too? what'll you pay?



**buy this lathe and get the capacity of both
at less than you pay for a 25" heavy duty!**

Do you turn a variety of chucking and between-centers work? Then the Nebel XB 20"/40" heavy duty extension bed gap is your best lathe investment. Because it has the capacity of two ordinary lathes. Yet occupies the floor space of but one machine . . . and calls for only one investment.

Other double-duty Nebel extension bed gap lathes: G 28"/50" heavy duty and AG 20"/40" medium duty. Nebel also manufactures removable block gap and standard lathes. Send for descriptive bulletins. Nebel Lathe Div., Nebel Machine Tool Corp., 3409-A Central Parkway, Cincinnati 25, Ohio.

For more data circle 323 on Reader Service Card





he **HAD**
to use a
polishing
cloth!

but **YOU** can use a Buckeye Air Tool!

The old line craftsman, rubbing away diligently with his polishing cloth, took a great deal of pride—and a great deal of time—in his work. The modern craftsman, guiding a compact, lightweight Buckeye polisher or buffer, takes just as much pride in his work, and accomplishes far more in much less time. Mass production and pride of craftsmanship still go hand in hand, with modern Buckeye air tools.



Why AIR Tools?

Because air is everywhere, just waiting to be put to work . . . because continuous operation can't possibly harm an air tool . . . and because, using Buckeye air tools, you can almost forget about tool maintenance.

In Air Tools,
Your Best Buy Is Buckeye

Buckeye Tools
CORPORATION

DIVISION 17 • DAYTON 1, OHIO

For more data circle 324 on Reader Service Card

"Greatest Value"

as applied to

Bridgeport

TURRET MILLING MACHINES

is no accident



Your nearest
dealer will gladly
furnish full infor-
mation . . .
or contact
us direct.

And the reason for this uni-
versally descriptive term
applied to "BRIDGEPORT
MILLERS" is simply and
briefly because, from base
to turret, they are designed
and built with "greatest
value" the objective in their
specifications.

For example, precision is of highest
order and components are held to closest
tolerance to achieve this objective.
Then, too, with the "BRIDGEPORT", ver-
satility contributes to "value" in that
with these machines, milling, drilling,
boring and shaping are operations
handled at all angles of the work with-
out changing setup. And with the re-
cently available True Trace Hydraulic
Duplicator attachment, the "BRIDGE-
PORT" offers excellent performance
and outstanding savings in time in
copying such parts as irregular dies and
moulds.

All these features have been tried
and proved in day-to-day service in
literally thousands of shops, large
and small, because the "BRIDGE-
PORT" is within the reach of any
and all shops who know "value and
modernize accordingly . . . with "BRIDGEPORTS."

Bridgeport

MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 325 on Reader Service Card



Loren Farris
PERSONNEL DIRECTOR
Detroit Division

Chicago Rawhide Manufacturing Co.



*"Look! It soaks up grease
just like a sponge."*

LAN-O-KLEEN removes 95% of all dirt and grime encountered in industry.

Easily — and safely!

LAN-O-KLEEN helps to protect the skin as it cleans. WEST — in pioneering the development of "double action" industrial cleaners — was the first to impregnate beneficial amounts of free lanolin into a corn meal type hand cleaner.

LAN-O-KLEEN is economical to use. It bulks greater than most other hand cleaners — therefore goes farther per pound. Too, the sturdy LAN-O-KLEEN dispenser rations just the right amount to do a quick, thorough cleansing job.

"We know of no safer hand cleaner than Lan-O-Kleen"

"We've always been interested in preventing dermatitis. This is why we've supplied our plant employees with Lan-O-Kleen for the past ten years. Its free lanolin and soft cleansing action help prevent skin irritations, yet quickly remove dirt, grease and grime," says LOREN FARRIS, Personnel Director, Detroit Division of Chicago Rawhide Manufacturing Company.

"Several of our departments have also used West Antiseptic Protective Hand Creams for a number of years. We know these aids to comfort and safety help keep our workers on the job at maximum efficiency."

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD



WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-33 Cosgrove Avenue, Montreal

- ☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
☐ Please have a West representative telephone for an appointment.

Name.....

Position.....

Mail this coupon with your letterhead to Dept. 20



For more data circle 326 on Reader Service Card

How Bullard
with two



Man-au-trol turret heads are gang-planed

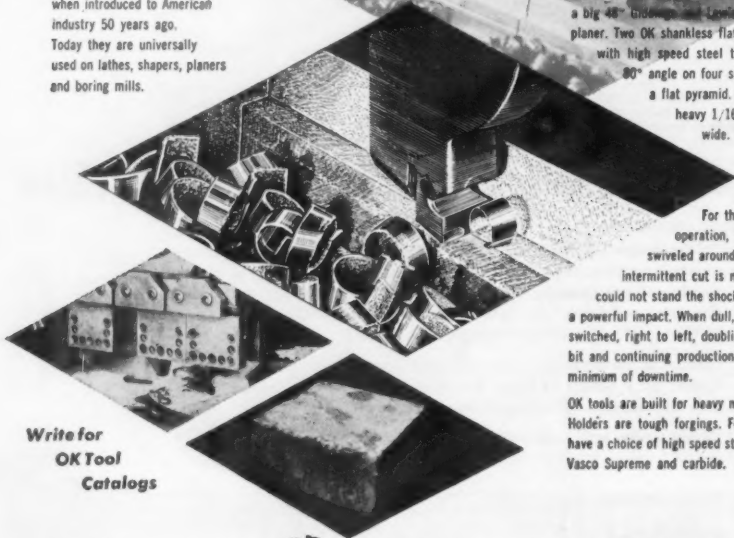
single point tools

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

Nine forged blades of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb. are anchored with a pin to the bed of a big 48" wide and 30 hp Hypor planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft/m.



For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobalt, Vasco Supreme and carbide.

Write for
OK Tool
Catalogs

TWO COMPONENTS—
BODY AND
BLADES



OK

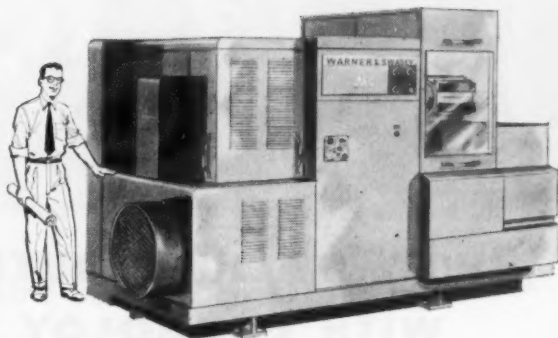
modern milling cutters
for modern milling machines

THE OK TOOL CO., INC., Milford, New Hampshire

For more data circle 327 on Reader Service Card

NEW Warner & Swasey 3AC Single Spindle Automatic Chucker widens field of profitable turning jobs

This versatile, new model was engineered for fast, automatic machining of your larger, complex chucking jobs. It provides accuracy, metal removal capacity, tooling flexibility and set-up ease and speed heretofore unobtainable by automatic operation in this work range.



SETS UP FAST—LIKE A TURRET LATHE

For over eight years, enthusiastic users have told us, "Performance records of our Warner & Swasey Single Spindle Chucking Automatics have been phenomenal."

The 1 AC model, first introduced at the 1947 Machine Tool Show in Chicago, met with instant field acceptance. In 1953-88 customers placed orders for the 2 AC model before the first machine was ever built!

Now, Warner & Swasey announces a new, larger capacity, more powerful 3 AC model with a 15-inch diameter chuck and a 40-horse-

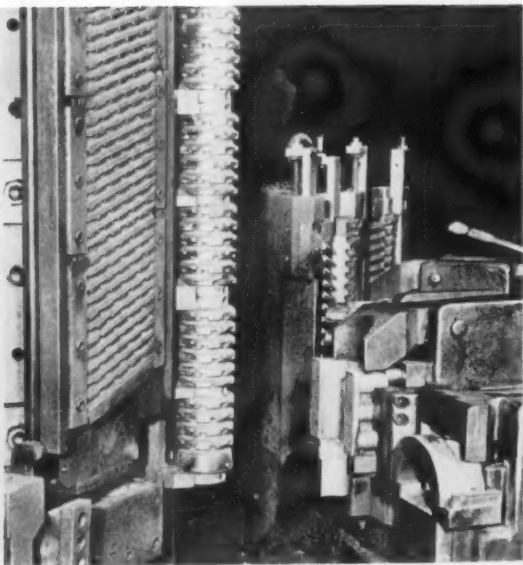
power motor, which will provide fast, automatic production for your larger pieces—precision and otherwise—in all lot sizes.

Our Field Representative will be glad to give you complete details on how this new machine can increase profits on your operations. Why not call him in, today?



NO MATTER WHICH WAY YOU TURN...WARNER & SWASEY CUTS COSTS

For more data circle 328 on Reader Service Card



Grade 883 increases broach life 2500%

Highly abrasive cast iron used for this bearing cap at Studebaker caused conventional broaches to fail after maximum run of only 3,600 parts. After the switch to Grade 883, initial broach ran 50 days, produced 90,000 parts without service. Over-all machining costs were reduced 22%.

Grade 370 saves 155 hours' machining time

Normal machining time on this 165-ton cast-steel propeller runner at S. Morgan Smith Co. was 220 hours. Despite abrasive patches, and interrupted cuts, Grade 370 cut machining time to 65 hours — $\frac{1}{3}$ the time. At 15 fpm, Grade 370 ran 30 hours without changing — compared to 6-8 hours with previous tools.

WHY MACHINE OUTPUT GOES UP WITH CARBOLOY CARBIDES ON



Grades for cutting every material

Eleven grades to choose from: 300 Series and 78 Series carbides for cutting steel; new Grade 860 for cast iron; five grades for nonferrous machining.



... in a form for handling every job

Standard tools in thirteen styles, hundreds of sizes. Standard blanks in wide range of styles and sizes. Inserts for Carboly toolholders or other standard types.

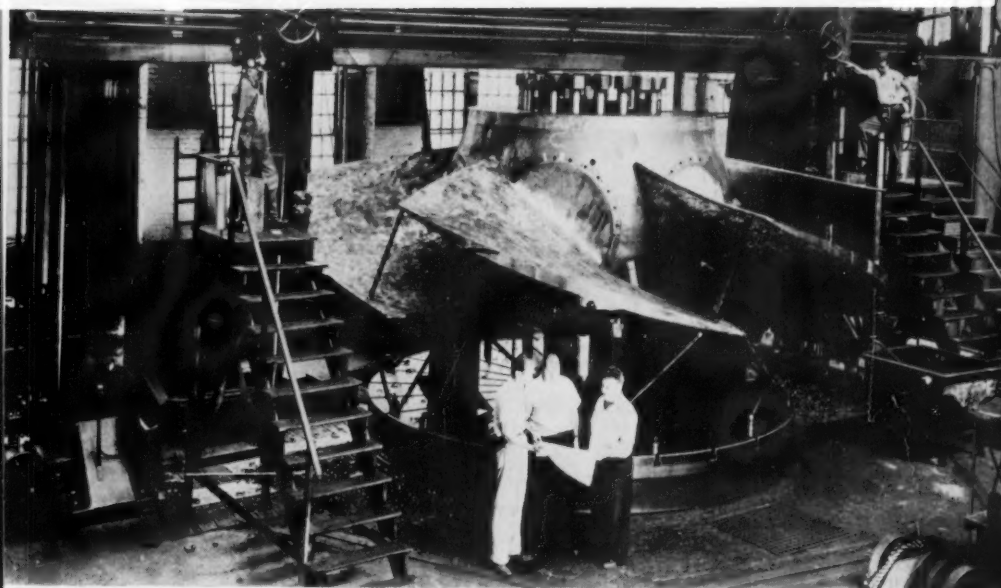
You'll
you ree
Carboloy

Your
can op
with th
produce
rugged

Your
grades
lower d
nance c

Hundre
above p
and trip
mach

The m
as cutt
of job. V
metals,
... one



AND UNIT COST COMES DOWN, YOUR METALCUTTING JOBS

- ▶ Carboloy cemented carbides are tailored to the job
- ▶ Let you cut faster without sacrificing tool life

You'll increase the productivity of your machines, while you reduce total manufacturing cost per piece, when Carboloy cemented carbides go to work on your jobs.

Your machines will be more productive, because they can operate at greater speeds and feeds when tooled with the Carboloy grade designed for the job. And they'll produce more per shift, because Carboloy carbides take rugged machining conditions without sacrifice of tool life.

Your units costs will go down, because the use of these grades means less machining time per piece . . . with lower downtime expense, reduced grinding and maintenance charges.

Proved in the field

Hundreds of inplant case histories like the two shown above prove Carboloy cemented carbides can double and triple output, save thousands of dollars per year in machine time, manpower, and tool costs.

The reason is simple. Each Carboloy carbide grade has cutting characteristics tailored to a particular type of job. Whether you're machining ferrous or nonferrous metals, whether you're taking heavy or finishing cuts . . . one of the eleven Carboloy carbide grades handles

the job. And you can quickly get the *grade* you need, in the *form* you need it.

Stocked locally by Carboloy Distributors

Your local Authorized Distributor of Carboloy cemented carbide products stocks standard tools, blanks, inserts, and toolholders in styles and sizes for every job or machine. He'll give you fast delivery, and expert technical assistance.

Call him today (you'll find his name in the Yellow Pages of your phone book). Or write: Metallurgical Products Department of General Electric Company, 11163 E. 8 Mile Street, Detroit 32, Michigan.

CARBOLOY
CEMENTED CARBIDES

GENERAL  ELECTRIC

For more data circle 330 on Reader Service Card

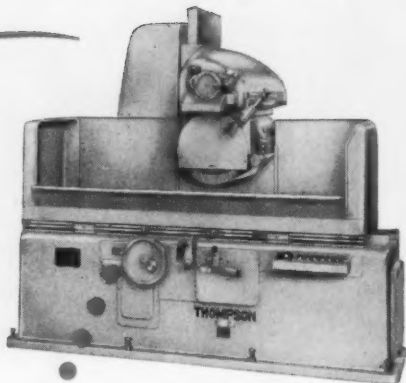
Thompson

grinders

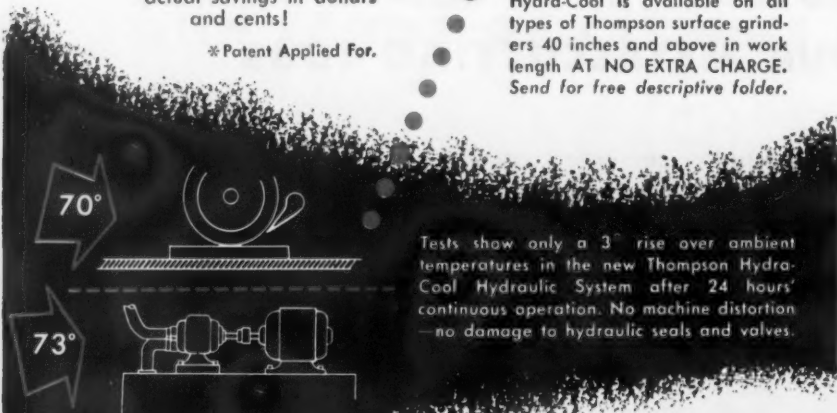
eliminate hydraulic system heat

Now, the new Thompson Hydra-Cool Hydraulic System* prevents heat distortion of the machine, for hydraulic heat is eliminated at its source—with the New Thompsons, you hold your tolerances, no matter how close they may be or how long the run! Hydra-Cool cuts scrap loss—gives you actual savings in dollars and cents!

*Patent Applied For.



Hydra-Cool is available on all types of Thompson surface grinders 40 inches and above in work length AT NO EXTRA CHARGE. Send for free descriptive folder.



Tests show only a 3° rise over ambient temperatures in the new Thompson Hydra-Cool Hydraulic System after 24 hours' continuous operation. No machine distortion—no damage to hydraulic seals and valves.

Again, Thompson leads in surface grinder engineering.

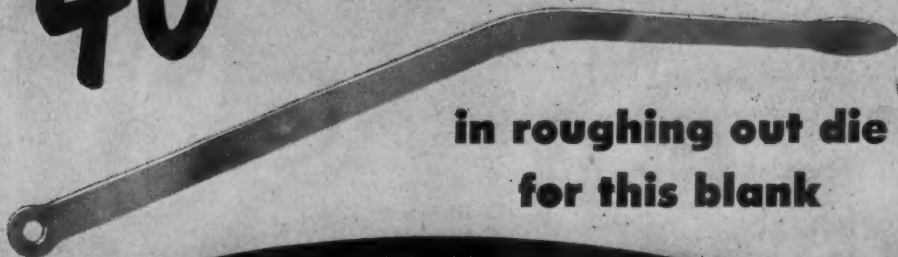
The Thompson Grinder Co.
W. Main St., Springfield, Ohio



For more data circle 331 on Reader Service Card

40%

SAVINGS



**in roughing out die
for this blank**

How it was done . . .



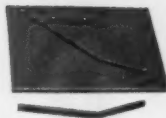
1 First the 7½" slug was removed from the 2¼" cast iron shoe.



2 Then the slug was sawed from the die (1" tool steel).

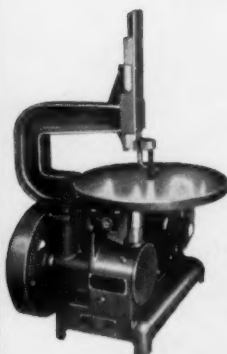


3 The third operation was the punch holder (1" cold rolled steel.)



4 The slug was removed from the stripper plate (¾" cold rolled steel).

SAW - FILE - LAP with OLIVER of ADRIAN DIE MAKING MACHINES

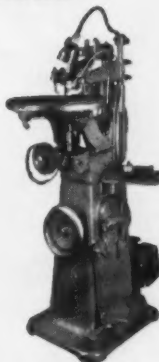


BENCH MODEL

. . . one of the five types in two sizes.

Yes, using the Oliver die making machine saved 40% of the time normally required for roughing out the die for the blank above. The opening has smooth sides, has no rough edges to chip off—and is within .010" of the finished outline. Similar savings can be had on template and cam work.

Oliver die making machines utilize power contour sawing—reduce filing to a minimum. Table tilt produces clearance for die work while filing. Saws, files, lapping sticks and hones can be used interchangeably.



HEAVY DUTY MODEL

. . . for metals up to 3" thick.

For more data circle 332 on Reader Service Card

Write today for information

OLIVER of ADRIAN

OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan

57 OR
DIRECT

ern

ne

pp

Street

Ohio

95

96

97

98

99

00

01

02

03

04

05

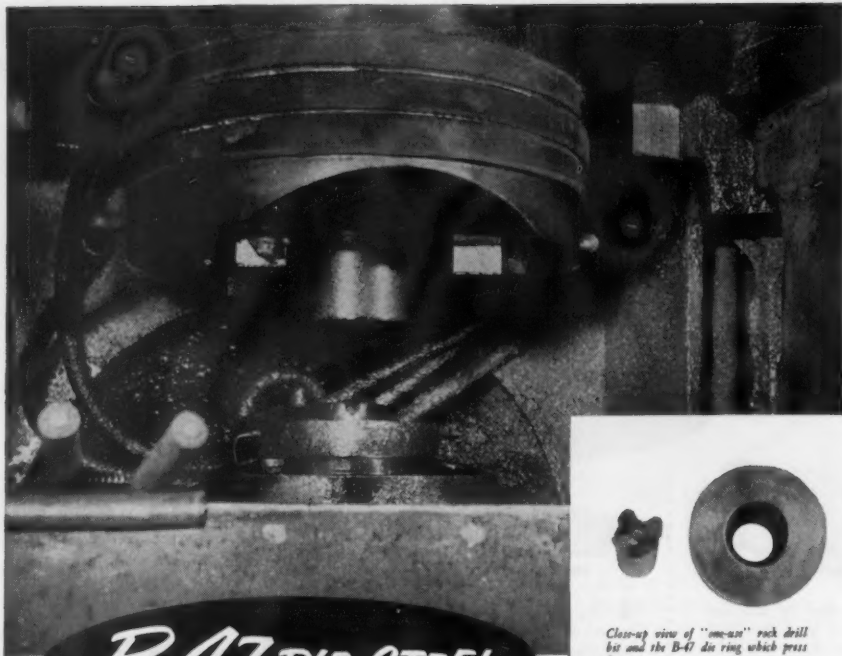
06

07

08

09

10



B-47 DIE STEEL

Close-up view of "one-use" rock drill bit and the B-47 die ring which presses it.

INCREASED ROCK DRILL BIT PRODUCTION 330%



Write for
BLUE SHEET on B-47

This concise four-page folder gives all needed handling and shop treatment details on B-47. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. Ask for your copy. ADDRESS DEPT. MS-92

A midwestern company increased their production of rock drill bits from 1500-3000 per die ring to a consistent total of more than 10,000 bits by switching to Allegheny Ludlum's B-47 die steel.

But of even greater importance, they claim, is the dependability of B-47:

"The less breakdowns we have, the less die changes we must make and the better production we get. Also, we are able to plan our production on the basis of being sure of the reliability of our dies."

Continued high production is necessary to make these special "one-use" bits com-

petitive in today's market. B-47 practically eliminates unscheduled downtime caused by die failure.

A-L's B-47 is a tough hot work steel. It has excellent resistance to shock and abrasion at elevated temperatures. Also, it is especially good for those applications which require ruggedness at relatively high hardnesses.

Check your A-L representative today about Allegheny Ludlum's complete line of tool and die steels—a grade for every job. Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh, Pa.

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call
Allegheny Ludlum



WSW 6847

For more data circle 333 on Reader Service Card

Use this Reader Service Card for connecting more information on products and services.

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

READER SERVICE CARD

August 1957 issue

RETURN BY OCTOBER 1, 1957 OR
WRITE TO MANUFACTURER DIRECT

Your Name _____

Your Title _____

Company Name _____

Company Address _____

City _____ Zone _____ State _____

Products Manufactured _____

Number of Plant Employees _____

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

431 Main Street
Cincinnati 2, Ohio

modern
machine
shop

EDITORIAL ITEMS

1	31	61	91	121	151	181	211	241	271
2	32	62	92	122	152	182	212	242	272
3	33	63	93	123	153	183	213	243	273
4	34	64	94	124	154	184	214	244	274
5	35	65	95	125	155	185	215	245	275
6	36	66	96	126	156	186	216	246	276
7	37	67	97	127	157	187	217	247	277
8	38	68	98	128	158	188	218	248	278
9	39	69	99	129	159	189	219	249	279
10	40	70	100	130	160	190	220	250	280
11	41	71	101	131	161	191	221	251	281
12	42	72	102	132	162	192	222	252	282
13	43	73	103	133	163	193	223	253	283
14	44	74	104	134	164	194	224	254	284
15	45	75	105	135	165	195	225	255	285
16	46	76	106	136	166	196	226	256	286
17	47	77	107	137	167	197	227	257	287
18	48	78	108	138	168	198	228	258	288
19	49	79	109	139	169	199	229	259	289
20	50	80	110	140	170	200	230	260	290
21	51	81	111	141	171	201	231	261	291
22	52	82	112	142	172	202	232	262	292
23	53	83	113	143	173	203	233	263	293
24	54	84	114	144	174	204	234	264	294
25	55	85	115	145	175	205	235	265	295
26	56	86	116	146	176	206	236	266	296
27	57	87	117	147	177	207	237	267	297
28	58	88	118	148	178	208	238	268	298
29	59	89	119	149	179	209	239	269	299
30	60	90	120	150	180	210	240	270	300

ADVERTISEMENTS

301	—Front Cover	435	465	495	525	555	585	615	645	675	705	735	765	795
302	—Inside Front Cover	436	466	496	526	556	586	616	646	676	706	736	766	796
303	—Inside Back Cover	437	467	497	527	557	587	617	647	677	707	737	767	797
304	—Back Cover	438	468	498	528	558	588	618	648	678	708	738	768	798
305	331	357	383	409	439	469	499	529	559	589	619	649	679	709
306	332	358	384	410	440	470	500	530	560	590	620	650	680	710
307	333	359	385	411	441	471	501	531	561	591	621	651	681	711
308	334	360	386	412	442	472	502	532	562	592	622	652	682	712
309	335	361	387	413	443	473	503	533	563	593	623	653	683	713
310	336	362	388	414	444	474	504	534	564	594	624	654	684	714
311	337	363	389	415	445	475	505	535	565	595	625	655	685	715
312	338	364	390	416	446	476	506	536	566	596	626	656	686	716
313	339	365	391	417	447	477	507	537	567	597	627	657	687	717
314	340	366	392	418	448	478	508	538	568	598	628	658	688	718
315	341	367	393	419	449	479	509	539	569	599	629	659	689	719
316	342	368	394	420	450	480	510	540	570	600	630	660	690	720
317	343	369	395	421	451	481	511	541	571	601	631	661	691	721
318	344	370	396	422	452	482	512	542	572	602	632	662	692	722
319	345	371	397	423	453	483	513	543	573	603	633	663	693	723
320	346	372	398	424	454	484	514	544	574	604	634	664	694	724
321	347	373	399	425	455	485	515	545	575	605	635	665	695	725
322	348	374	400	426	456	486	516	546	576	606	636	666	696	726
323	349	375	401	427	457	487	517	547	577	607	637	667	697	727
324	350	376	402	428	458	488	518	548	578	608	638	668	698	728
325	351	377	403	429	459	489	519	549	579	609	639	669	699	729
326	352	378	404	430	460	490	520	550	580	610	640	670	700	730
327	353	379	405	431	461	491	521	551	581	611	641	671	701	731
328	354	380	406	432	462	492	522	552	582	612	642	672	702	732
329	355	381	407	433	463	493	523	553	583	613	643	673	703	733
330	356	382	408	434	464	494	524	554	584	614	644	674	704	734

BUSINESS REPLY CARD

No Postage Stamp Necessary If Mailed In the United States

4 C POSTAGE WILL BE PAID BY—

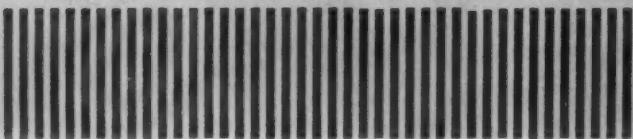
**modern
machine
shop**

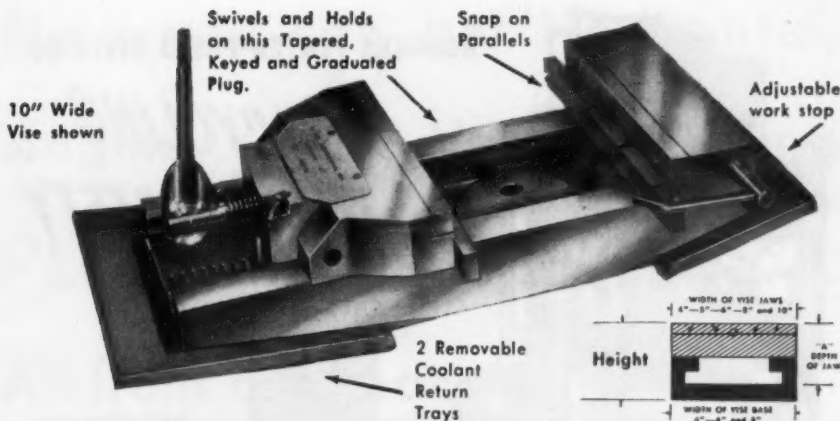
**431 MAIN ST.
CINCINNATI 2, OHIO**

FIRST CLASS

PERMIT No. 1702

CINCINNATI, OHIO





The only **HARDENED & GROUND** SWIVEL MILLING MACHINE VISE

No Pedestal

OPERATOR WILL NOT HAMMER HANDLE

The J&S CLAMPCUT Milling Vise multiplies the clamping and holding power expected of a milling machine vise. The adjustable jaw head and positive down-holding clamping action gives multiplied pressure.

VERSATILE

- Holds out of square and out of parallel rough work pieces
- Adjustable VEE for holding rounds
- Rough work is held vertically

ACCURATE

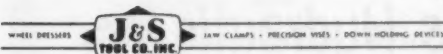
- Powerful vise allows high accuracy for repetitive positioning
- Adjustable features permit faster better machining
- Mill .0005" parallel, or better

FASTER, EASIER TO OPERATE

- Larger opening
- Adjustable and deburring snap-on parallels
- Trigger opening and closing
- Coolant return trays
- Half the weight of standard vises, yet has twice the opening

WIDTH	OPENING	DEPTH OF JAW	HEIGHT	WEIGHT
4"	6"	2 1/8"	3 1/2"	23 lbs.
5"	8"	2 1/8"	3 1/2"	27 lbs.
6"	9"	2 1/8"	4"	35 lbs.
8"	12"	3 1/2"	4 1/2"	100 lbs.
10"	12"	3 1/2"	4 1/2"	115 lbs.

Distributors in Principal Cities

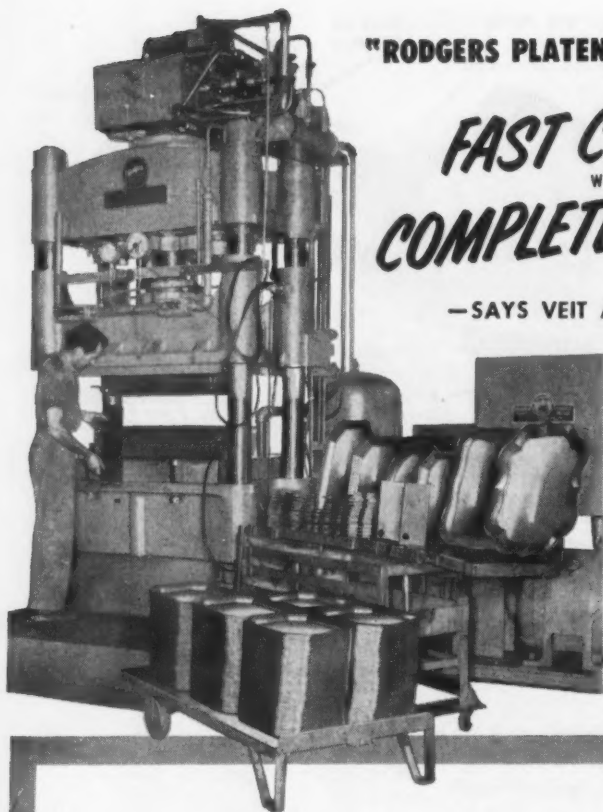


J & S TOOL CO., INC.

CLAMPCUT

871 DORSA AVE.
LIVINGSTON, NEW JERSEY

For more data circle 334 on Reader Service Card



"RODGERS PLATEN PRESS GIVES US

FAST CYCLING
WITH
COMPLETE SAFETY"

—SAYS VEIT AND YOUNG

Rodgers 400-ton platen press in use at Veit and Young, Huntingdon Valley, Pa., metalworking specialists. The press is equipped with die cushion, fast cycling cylinders and other accessories. Some of the products formed are stacked by the press.

Production has been increased in drawing and forming large serving trays and electrical panels by Veit and Young with their Rodgers Platen Press. Safety controls permit operators to concentrate on speed and accuracy. They are working type 303 stainless steel, brass, carbon steel, aluminum—from $\frac{1}{32}$ " to $\frac{1}{8}$ " thick with bends up to 90°.

Auxiliary cylinders lower and

raise platen quickly for fast cycling. Forming pressures are preset from 80 to 400 tons—die cushion up to 50 tons. Simple, fast adjustments govern all platen, pressure and time cycles. If you work in metal, plastic, rubber, veneers—you can mold, draw, form—faster with a Rodgers Platen Press. Capacities 10 to 600 tons. Send for Rodgers "Blue Ribbon" Platen Press Catalog.



Rodgers Hydraulic Inc.

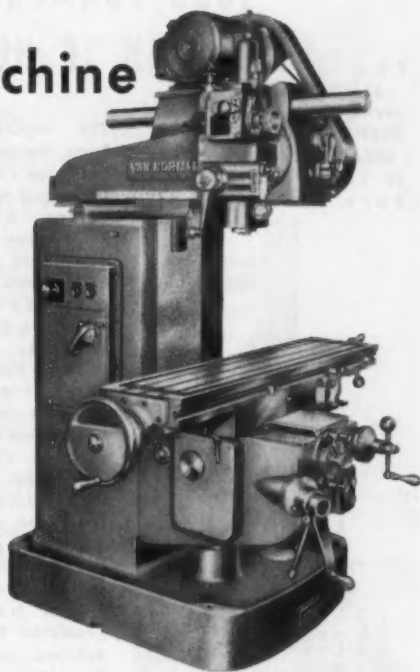
7447 WALKER STREET • MINNEAPOLIS 26, MINN.

For more data circle 335 on Reader Service Card

Now you can get Horizontal,
Angular,  Vertical Milling
PLUS Boring and Drilling

All from one machine

WHEN it's a
VAN NORMAN
No. 16S



You make one investment in one machine . . . and when it's a Van Norman No. 16S, with quill type-adjustable cutterhead, you've got the most versatile machine available.

This quill type cutterhead is mounted on a rugged, heavy-duty movable ram that increases the scope of operations . . . permits maximum cuts. The 16S reduces overall completion time . . . offers numerous opportunities to cut costs, increase production.

Get complete details on the versatile Van Norman 16S today. Write, wire or telephone for catalog.

Don't wait . . . for extra profit install a Van Norman machine now! They are

available on several purchase plans . . . Outright sale . . . On conditional sales contract up to five years . . . Pay as you depreciate up to 10 years.

Conditional Sales Contracts not available to Export.

VAN NORMAN MACHINE COMPANY
SPRINGFIELD 7, MASSACHUSETTS

MANUFACTURERS OF—Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders

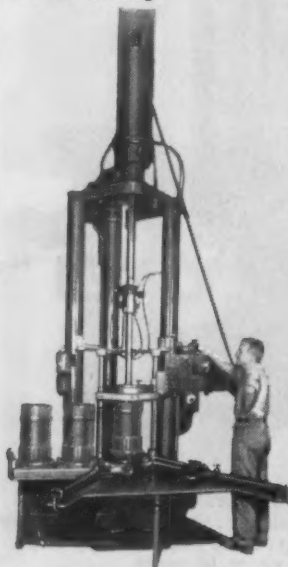
For more data circle 336 on Reader Service Card

So you think we're just talking?

But

**FULMER CAN HONE IN 40 MINUTES
JOBS FORMERLY GROUND
IN 16 HOURS!**

The same
unbelievable
savings can be
PERFORMANCE-
GUARANTEED
on internal
bore honing.



The replacement of conventional bore finishing methods with Fulmer Precision-Honing usually brings time and cost savings that, at first glance, appear unbelievable! Production estimates by Fulmer engineers are based on long experience and calculated by a positive mathematical formula which is consistently proved accurate.

FULMER Precision-honing of internal bores is a stock-removing process in which abrasive stones are applied under controlled pressure to produce a round and straight bore to accuracy as close as .0001 (\pm) in. It removes as much as 1/16 in. from the diameter at rates up to 1½ cu. in. per minute. Chip curls as long as six inches demonstrate the stock-removing properties of the Fulmer honing process. Fulmer precision honing of internal bores assures amazing savings. Other finishing methods are now "old fashioned" — Why not get up to date? Write for bulletin on honing to: C. Allen Fulmer Co., Dept. S, 107 E. 4th St. Cincinnati 2, Ohio



FULMER honing equipment

For more data circle 337 on Reader Service Card

from the
BOARD

to the
**ASSEMBLY
LINE**

DPS *has*

**the technical know-how
to "engineer" more speed
and profit into your
assembling operations.**

● The signal success of DPS trained engineers in adapting power equipment to the individual feeding and assembling needs of industrial plants everywhere is assurance that they can likewise solve your special problems. In our broad line of

**SELECTIVE PARTS FEEDERS
POWER SCREWDRIVERS
SPECIAL ASSEMBLING MACHINES**



BOWL FEEDER

Electrical vibratory type to feed parts that cannot be tumbled.

equipment can be selected, and custom features incorporated, to fit your requirements. Plan now to use DPS modern assembling methods. Tell us your set-up. Write for catalog and further details.



**POWER
SCREWDRIVERS**

An extensive, versatile line in both bench and pedestal types.



**BARREL
FEEDER**

Popular motorized type, for parts requiring critical selection.

**DETROIT
POWER
SCREWDRIVER CO.**

2807 W. FORT STREET • DETROIT 16, MICHIGAN

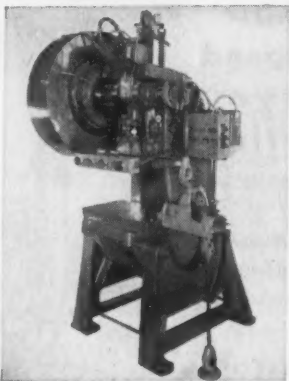
For more data circle 338 on Reader Service Card

DISCOVER THE "difference"

in

VERSATILITY

with PRESS-RITE POWER PRESSES



•
Handles greater variety of jobs

•
Fast, easy set-ups

•
For production or job work

•
Greater production at lower cost

•
More standard features

ALWAYS choose Press-Rite Presses for versatility. Greater shut height . . . large bolster area . . . variable speed drive . . . left or right flywheel design . . . single or continuous stroke . . . flanged rams . . . built-in design for die cushion . . . counter-balances . . . tilting mechanism . . . and many other features provide smooth operation over a wide range of jobs from drawing to punching.

WRITE today for your copy of the Press-Rite catalog with illustrations — cutaways — specifications — and budget fitting prices.

PRESS-RITE DIVISION of

SALES SERVICE MACHINE TOOL COMPANY

2355 University Avenue • St. Paul 14, Minnesota

Used by more . . . for more production

35 STANDARD
MODELS
2 TO 85 TON
CAPACITIES

PRESS-RITE

OPEN BACK • INCLINABLE *Power Presses*

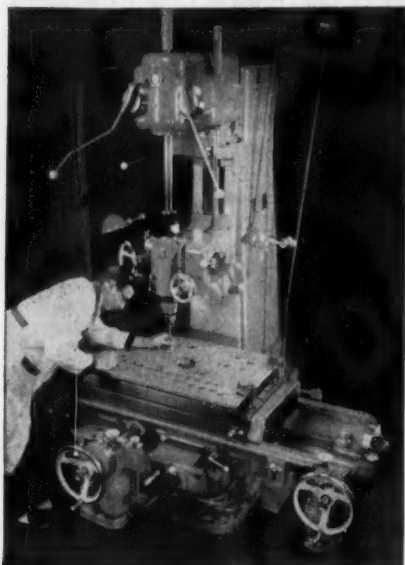
For more data circle 339 on Reader Service Card

BUY Precision THAT FITS...!

for tenths
**YOU NEED A
CLEEREMAN JIG BORER**

OR

for .001"/foot
**YOU NEED A
LAYOUT DRILLING MACHINE**



If your work involves gages, jigs, fixtures, or "jigless" production with ultra-fine tolerances, one of the three models of Cleereman Jig Borers is the answer.



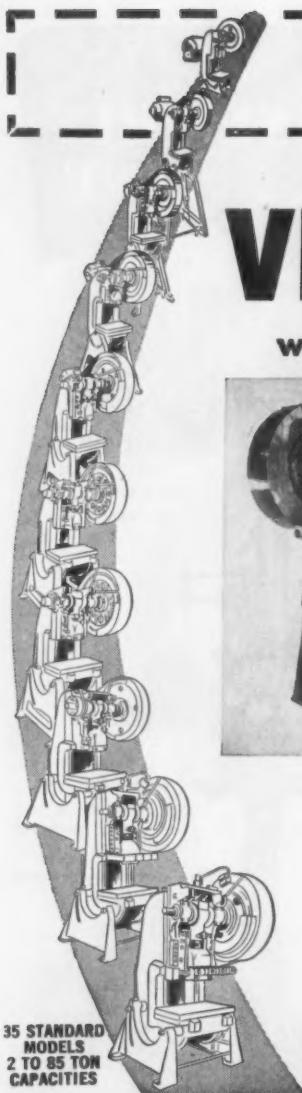
But when your work calls for tolerances of .001" per foot, the economy of the Layout Drilling Machine is the "common sense" approach to your problem.

There are installations near you. Your Cleereman distributor can answer your questions and arrange an inspection visit for you.

BRYANT
Machinery & Engineering
• Company •
General Office
555 West Washington Blvd., Chicago 6
Representatives in Principal Cities

CLEEREMAN MACHINE TOOL CORP.
GREEN BAY, WISCONSIN

For more data circle 340 on Reader Service Card

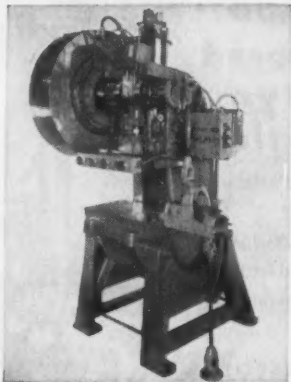


DISCOVER THE "difference"

in

VERSATILITY

with PRESS-RITE POWER PRESSES



•
Handles greater variety of jobs

•
Fast, easy set-ups

•
For production or job work

•
Greater production at lower cost

•
More standard features

ALWAYS choose Press-Rite Presses for versatility. Greater shut height . . . large bolster area . . . variable speed drive . . . left or right flywheel design . . . single or continuous stroke . . . flanged rams . . . built-in design for die cushion . . . counter-balances . . . tilting mechanism . . . and many other features provide smooth operation over a wide range of jobs from drawing to punching.

WRITE today for your copy of the Press-Rite catalog with illustrations — cutaways — specifications — and budget fitting prices.

PRESS-RITE DIVISION of

SALES SERVICE MACHINE TOOL COMPANY

2355 University Avenue • St. Paul 14, Minnesota

Used by more . . . for more production

PRESS-RITE

OPEN BACK • INCLINABLE *Power Presses*

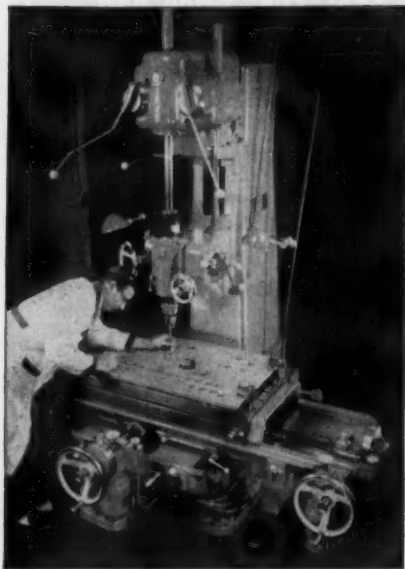
For more data circle 339 on Reader Service Card

BUY Precision THAT FITS...!

for tenths
YOU NEED A
CLEEREMAN JIG BORER

OR

for .001"/foot
YOU NEED A
LAYOUT DRILLING MACHINE



If your work involves gages, jigs, fixtures, or "jigless" production with ultra-fine tolerances, one of the three models of Cleereman Jig Borers is the answer.



But when your work calls for tolerances of .001" per foot, the economy of the Layout Drilling Machine is the "common sense" approach to your problem.

There are installations near you. Your Cleereman distributor can answer your questions and arrange an inspection visit for you.

BRYANT
Machinery & Engineering
• Company •
General Office
555 West Washington Blvd., Chicago 6
Representatives in Principal Cities

CLEEREMAN MACHINE TOOL CORP.
GREEN BAY, WISCONSIN

For more data circle 340 on Reader Service Card



DoALL

PRECISION GROUND FLAT STOCK

TOOL and DIE STEEL
AIR and OIL HARDENING

Cuts Tool, Die, Gage and Fixture Costs 15% or More By Eliminating Surface Grinding!

Air Hardening Tough Abrasive Jobs	Oil Hardening Proven Analysis
Carbon1.00%	Carbon0.90%
Manganese ..0.50%	Manganese ..1.20%
Chromium ...5.00%	Silicon0.30%
Molybdenum 1.25%	Tungsten ...0.50%
Vanadium ...0.30%	Chromium ...0.50%
	Vanadium ...0.20%

Size is accurate to: thickness—.001; width—.005, —.000, with all edges square to face within 10 minutes of a degree! 25 micro inch RMS finish or better!

FREE

Toolroom Wall Chart

Complete standard size listing of all air and oil hardening Precision Ground DoALL tool and Die Steel... send for it today!



Example: you need a 1" x 4" x 18" piece of oil hardening steel. Remembering to order it oversize so you can grind away 1/16" scale and decarburizing on all surfaces, you specify Hot Rolled Steel 1 1/8" x 4 1/8" x 18"—\$19.68. You spend for grinding to size and overhead \$12.00 (2 hrs. @ \$6.00 per hr.). Total cost, \$31.68.

But, you can order the same piece, finished ground in Precision Ground Tool and Die Steel from DoALL for only \$26.79 and save \$4.89... with no danger of rejections and no wasted labor and machining time.

... and DoALL Tool and Die Steel:

Keeps ahead of scheduling... just ink it, mark it, cut it!

Is easier to machine... saws to any shape on a band machine!

Simplifies heat treating... non-deforming and distortion resistant!

Prompt delivery... over 1500 standard sizes... local stocks... fast delivery on special sizes!

Save money on your tool and die jobs... see your local DoALL Sales-Service Store or write for further information:

The DoALL Company, Des Plaines, Illinois

TS-165R



Call Your **DoALL** Service-Store

MACHINE TOOLS **CUTTING TOOLS** **INSTRUMENTS** **SHOP SUPPLIES**

Band Saws **Surface Grinders** **Power Saws** **DoALL SAW BANDS** **DoALL CASE MACHINES** **DoALL GRINDING PLATES** **MEASURING INSTRUMENTS** **SHOP SUPPLIES**

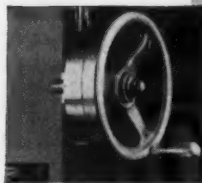
For more data circle 341 on Reader Service Card

FOOTBURT

Accurate grinding for small parts

The Hammond No. 2, 6" x 18", Surface Grinder is a precision tool room machine for use on the most accurate gauge and tool work. The standard spindle is direct motor driven and is mounted on precision preloaded ball bearing. Total vertical adjustment is 10 $\frac{3}{4}$ ". In and out movement of table is 6 $\frac{1}{2}$ " with a longitudinal travel of 18".

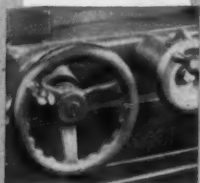
THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: 24632 Northwestern Hwy., Detroit 35, Mich.



Accurate Spindle Adjustment—Standard vertical adjustment of spindle through handwheel is .0005". With Vernier attachment, spindle can be raised accurately to .00005".



Solidly Supported Spindle Carrier—Spindle carrier is moved vertically on double dovetail ways with adjustable tapered gibs.



Convenient Hand Control—Handy wheels for cross travel, accurately gauged to thousandths, and quick acting longitudinal travel.



Smooth Roller Chain Table Drive—Remarkably smooth finish on work without chatter marks frequently found when table is moved by conventional means through rack and pinion.

FOOTBURT

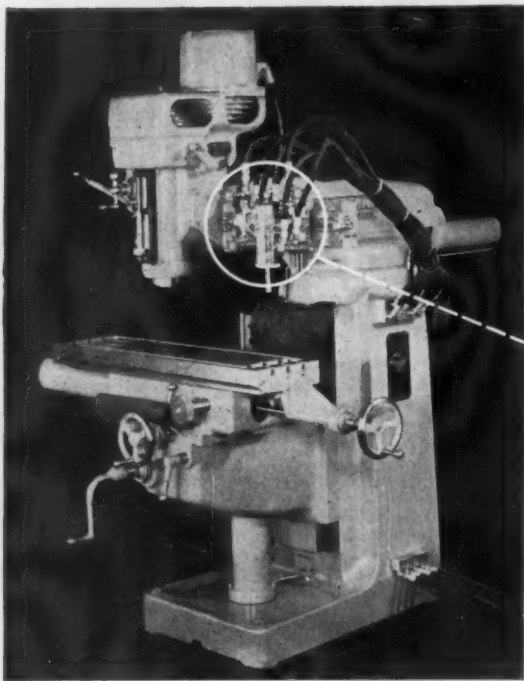
SURFACE GRINDING

For more data circle 342 on Reader Service Card

Write for
Circular #13A.

Now "Micrometer Accuracy" Applied to Hydraulic Tracer Control

Provides more speed in Production Profiling and Duplicating



Gorton Trace-Master Hydraulic Tracer control is today's best unit for 2- and 3-dimensional duplication, production profiling and work on all types of die forging, die casting, metal stamping, embossing and coining, as well as plastic molds in both ferrous and non-ferrous materials.

GORTON "TRACE MASTER" Supersensitive Hydraulic Control

This master control valve is manufactured to tolerances which are NEW in the field of hydraulics. Working parts are so delicately ground and lapped that they will operate only with a very fine grade of special oil. Ordinary hydraulic fluids are wholly unsuitable.

3 MODELS AVAILABLE

180° Vertical Hydraulic Feed to Knee.

360° Cross Hydraulic Feed to Ram and Longitudinal Hydraulic Feed to Table.

3D Hydraulic feed to knee, ram and table for 3-dimensional work.

The above can be furnished with the Gorton 1-22 Masternil illustrated here or the Gorton 9-J Super-Speed Vertical Mill with single spindle, twin spindles and/or six inch higher column for additional vertical capacity.

Write for complete information contained in bulletin 2771-1708.



GEORGE **GORTON** MACHINE CO.

1708 RACINE STREET

RACINE, WISCONSIN

Tracer-Controlled Pantographs, Duplicators—standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.
SINCE 1893

For more data circle 343 on Reader Service Card

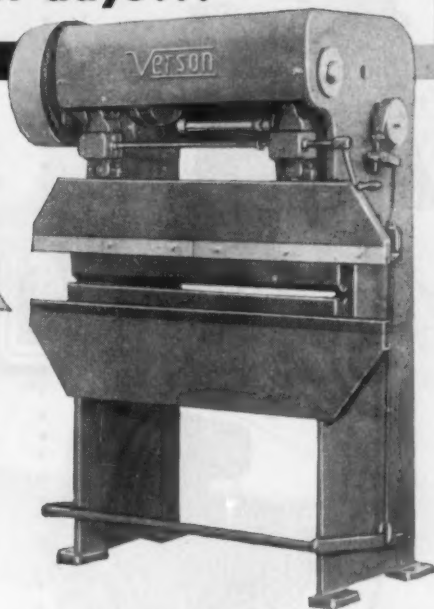
\$1600*

**will put this Power Press Brake
to work in your shop
in a matter of days...**

**IMMEDIATE
DELIVERY
FROM STOCK**

STANDARD DIES

48" long, 90° "V" dies for
handling 16 ga. stock in the
16-48 are priced at \$102.



If you're trying to "get by" without a power press brake . . . or if you're tying up big brakes on small jobs . . . here's the answer to your problem — a rugged Verson Model 16-48 press brake. You can get one right "off the shelf" for only \$1600*. You

**Prices F.O.B. Chicago, less dies; subject to change without notice.*

get the famous Verson all steel construction plus proved-in-service Verson design. Capacity is 16 ga. x 48" of mild steel. Write for complete specifications and then place your order. That's all there is to it . . . no involved proposals . . . no delays.

160

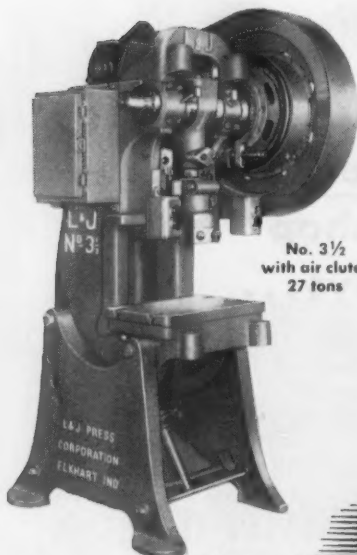


ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

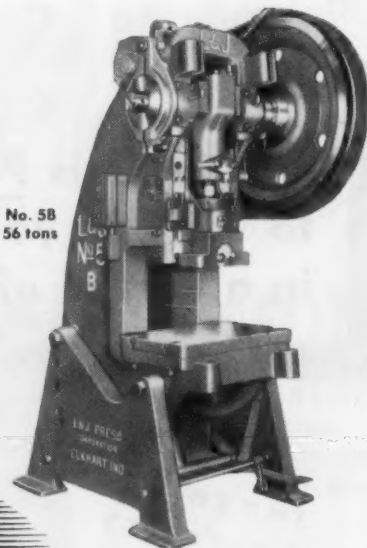
VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois
8300 S. Central Expressway, Dallas, Texas

For more data circle 344 on Reader Service Card



No. 3 1/2
with air clutch
27 tons



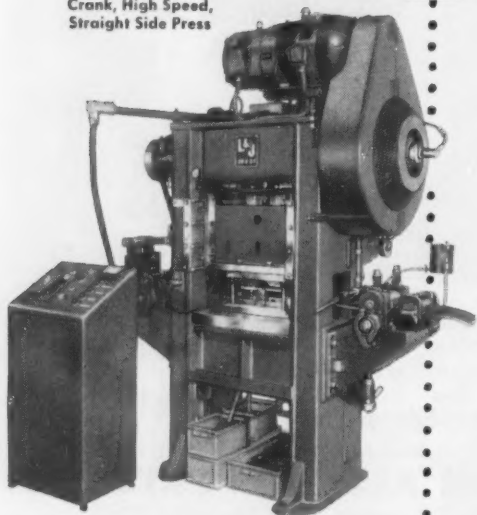
No. 5B
56 tons



PRESSES

Speed Output Reduce Costs

20 ton Double
Crank, High Speed,
Straight Side Press



Ruggedly built punch presses that bring economies to a wide range of work. There is speed when it can be used . . . accuracy and rigidity to hold tolerances and give long die life . . . minimum maintenance . . . and wide-gap models for big dies. The balanced design and quality construction of L & J Presses also insure dependability that can help your production. 23 O. B. I. Presses—14 to 90 tons, 20 to 100 ton Straight Side Presses. *Write—*

**L & J PRESS
CORPORATION**

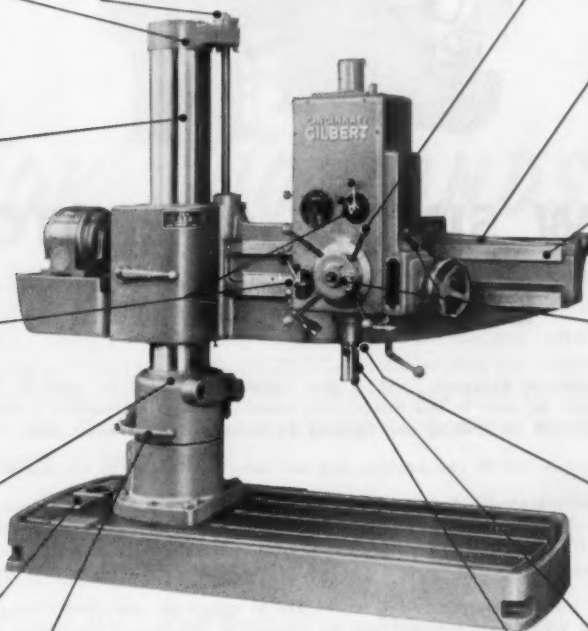
1624 STERLING AVE., ELKHART, IND.

For more data circle 345 on Reader Service Card

ONLY GILBERT RADIALS

OFFER ALL THESE FEATURES

When you order a Cincinnati Gilbert radial, you get more new features per dollar than any other radial can offer. And every feature is designed to give you maximum return on your investment—in performance, productivity, and dependability.



Safety elevating nut protects both operator and machine

Weight carried on opposed Timken bearings

Hardened column available

Direct-reading speed and feed shifters; gears counterbalanced for easy shifting

Adjustable ball bearing rollers on hardened ring for maintained rigidity

Long heel on heavy base provides 360° stability

Powerful, accurate electric column clamp available

Four-lever turnstile cuts machine handling time

Balanced arm resists torsion, compression, tension forces

Head rides on anti-friction bearings; clamps three surfaces

When disengaging positive feed clutch, spindle won't drop

Full spindle support near tool; runout is less than .001"

Hardened tang slot is an exclusive Gilbert feature

You can always see the spindle; get extra use of spindle travel

And don't overlook these additional features:

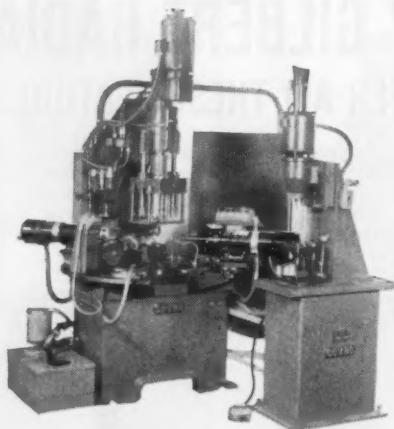
- wide range of spindle speeds for efficient tool performance;
- hardened gears throughout the machine;
- standard or special tap leads available;
- modern styling which reduces housekeeping, convinces customers that your shop is up-to-date;
- low-cost financing: 8% simple interest (4¼% add on), up to 5 years to pay.

Write or call for Bulletin 349.

those who buy Gilbert buy Gilbert again

THE CINCINNATI GILBERT MACHINE TOOL CO.
3348 BEEKMAN STREET, CINCINNATI 23, OHIO

For more data circle 346 on Reader Service Card



NEW SINGLE-OPERATOR DUAL MACHINE

How Govro-Nelson Automatic Drilling and Tapping Units can be used to speed up production can be seen in this two-position machine which incorporates 2 vertical and 5 horizontal units for drilling and tapping 12 holes in three similar parts.

Two holes are drilled in one position and ten holes are tapped in the second position.

The operator alternately loads the two machines, completing the drilling operations on a manually clamped fixture (right), and tapping ten holes simultaneously on the second machine (left) which automatically clamps, taps and releases the part. Output: 300 parts per hour.

If you have similar operations and would like to speed up your production rate, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up. Literature sent upon request.

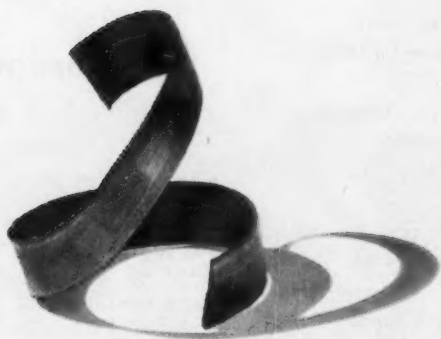
GOVRO-NELSON CO.

Machinists of Precision Parts for 34 Years

**1933 Antoinette
Detroit 8, Mich.**

Automatic **DRILLING UNIT**

For more data circle 347 on Reader Service Card



LOOK...NO HANDS!

That's right! The May-Fran CHIP-TOTE permits the continuous operation of machine tools by eliminating down-time for scrap removal... skilled workers stay on the job... production increases by as much as 20%! Versatile CHIP-TOTE conveyors are available in a wide range of sizes to serve practically any type or size of machine tool. Conveyor speed is adjusted to meet the scrap removal needs of the machine.

**REMOVE CHIPS, TURNINGS AND
BORINGS CONTINUOUSLY AND
AUTOMATICALLY WITH A
MAY-FRAN CHIP-TOTE**



MAY-FRAN

ENGINEERING, INC.

1708 Clarkstone Rd., Cleveland 12, Ohio



7586-MF

**Write today for your
copy of Bulletin MF-640**

For more data circle 348 on Reader Service Card

TREPANS

- ▶ **Maximum Diameter** — $\frac{5}{8}$ inch.
- ▶ For fast-production, multi-spindle machines.
- ▶ Specially heat-treated, high speed steel.
- ▶ With back taper or radial relief.
- ▶ Made by specialists in the design of small tools.



WOODRUFF & STOKES CO.
INCORPORATED

Bldg. 32, 357 Lincoln St., Hingham, Massachusetts
For more data circle 349 on Reader Service Card

Meetings

Important Meeting

Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

September 9-13 • Instrument Society of America, Annual Instrument-Automation Conference and Exhibit, Public Auditorium, Cleveland, Ohio. Society headquarters: 313 Sixth Ave., Pittsburgh 22, Pennsylvania.

September 17-20 • American Die Casting Institute, Annual Meeting, Edgewater Beach Hotel, Chicago. Institute headquarters: 366 Madison Ave., New York 17, New York.

September 22-24 • American Machine Tool Distributors Association, Annual Meeting, Hotel Cleveland, Cleveland. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

September 23-26 • Association of Iron and Steel Engineers, Annual Convention, Penn-Sheraton Hotel, Pittsburgh. Association headquarters: 1010 Empire Bldg., Pittsburgh 22, Pennsylvania.

September 29-October 3 • National Screw Machine Products Association, Fall Membership Meeting, Broadmoor Hotel, Colorado Springs. Association headquarters: 2860 E. 130th St., Cleveland 20, Ohio.



OF COURSE . . . IT'S

American!

Best for every I.D. g



High Production At Lowest Cost. Norton wheels for internal grinding are precision-processed to give completely uniform structure and identical top performance. There's no fussing with timing cycles when you change wheels.

Norton wheels spread the "Touch of Gold" across the internal grinding range

For high production grinding, 44 ALUNDUM[®], 57 ALUNDUM, 19 ALUNDUM and regular ALUNDUM abrasives are all quality abrasives at non-premium prices. In particular, the new 44 ALUNDUM wheels have earned high praise from users in many different types of applications. For example:

A Michigan customer reports: *Break-down was very even, with less glazing, excellent cutting action, and half the dressings needed by standard wheels. "44's" were the*

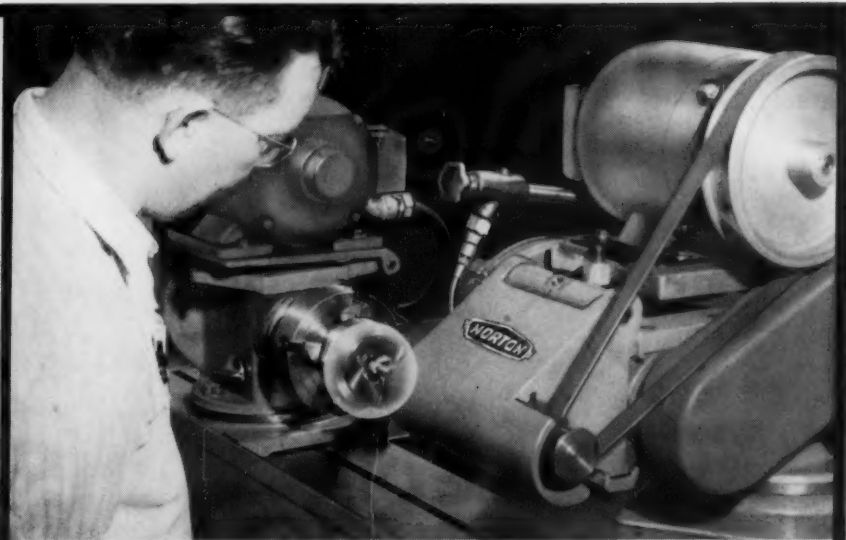
best ever used.

From a New Jersey user the report is: *The "44's" are great for grinding sharp radii, with 30% more pieces per dressing and per wheel, and finish improved from 28 to 15 r.m.s.*

A Pennsylvania customer says "44's" are: *Freer cutting wheels that hold form better, require less dressing and greatly improve finish.*

Whichever of these abrasives you use, team it up with the Norton G Bond, the

D. grinding job you do



Money-Saving Precision In Toolroom And Miscellaneous Internal Grinding is assured by the completeness of the Norton line — the right abrasive and bond for every type of job on every type of grinder.

W-1820

most efficient vitrified bond ever developed for accurate production grinding.

When your I.D. grinding is the toolroom type, choose 38 ALUNDUM or 32 ALUNDUM abrasive — the latter especially for the more-difficult-to-grind steels because of its outstanding ability to penetrate and hold the cut. And with these two famous abrasives, select G or BE bonds — both vitrified.

Your Norton distributor will gladly arrange a test of these "Touch of Gold" wheels in your plant. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

For more data circle 352 on Reader Service Card



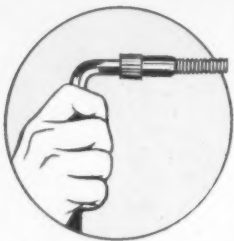
*Making better products . . .
to make your products better*

NORTON PRODUCTS

Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING DIVISION
Coated Abrasives
Sharpening Stones • Behr-cat Tapes

STUCK DIES

... quickly, easily
released with
exclusive
patented
**LODGE & SHIPLEY
WEDGE TYPE
RAM PRESSURE
RELEASE**



THIS . . .



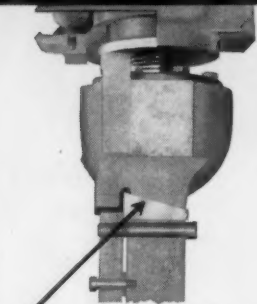
NOT THIS!

- Use wrench not a cutting torch
- in minutes instead of hours
- without damage . . . die holder destroyed

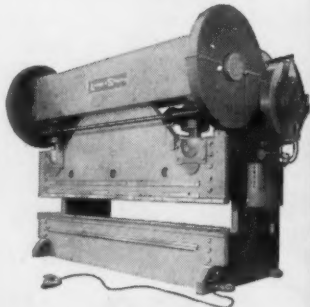
When a press brake is stalled due to improperly adjusted dies . . . do you face a short delay or near disaster?

With a Lodge & Shipley Press Brake, release of the stuck dies is a quick, simple, non-destructive matter as described in the accompanying detail.

This is but one of many outstanding Lodge & Shipley Press Brake features designed for fast, accurate, efficient and dependable press brake operation. New literature gives complete details. Write: **The Lodge & Shipley Co., 3073 Colerain Ave., Cincinnati 25, Ohio.**



The Lodge & Shipley Wedge Type Ram Pressure Release is unusually simple and rugged in design. A heavy steel wedge has a top angle that complements a similar angle on the base of the ram pitman socket housing. Held securely by a heavy steel plate, the wedges can be released quickly to provide up to 1/4" additional clearance.



Lodge & Shipley . . . your Lodge-ical choice

For more data circle 353 on Reader Service Card

modern machine shop

ADVERTISING REPRESENTATIVES

Duncan W. Barton, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

Granville M. Fillmore, Vice President, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

John M. Krings, Vice President, Tribune Tower, Chicago 11, Illinois, DElaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

George E. Hay, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Central Indiana.

Gene J. Schwarber, Advertising Manager, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Eastern Michigan, Missouri, Kansas.

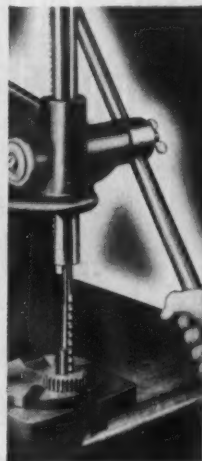
The Robert W. Walker Company, 730 South Western Ave., Los Angeles 5, Calif., DUNKirk 7-4388, 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★ ★

modern machine shop
431 Main St. Cincinnati 2, Ohio

August, 1957

CUT KEYWAYS in ONE MINUTE for ONE CENT with the *Minute Man* KEYWAY BROACH KIT



Using an arbor press you can cut keyways for as little as a penny a piece in just one minute with the Minute Man Keyway Broach Kit. For keyways from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3".



Minute Man Broaches for square and hexagonal holes and Production Type Keyway Broaches are also available from stock from your Industrial Distributor.

SEND FOR
CATALOG
and
PRICE LIST



The duMONT CORP.
Greenfield, Mass.

MAIL FREE BROACH CATALOG AND PRICE LIST S describing Square Broaches, Hexagon Broaches, Production Type Keyway Broaches and Keyway Broach Kits to

Name
Company
Address

For more data circle 354 on Reader Service Card

modern machine shop 53

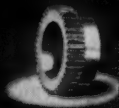
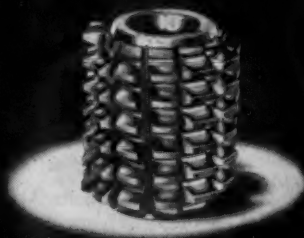
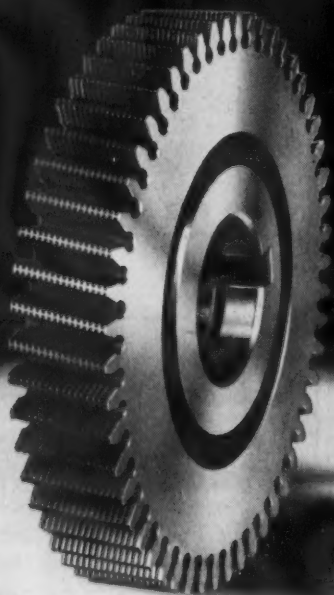
the Finest Tools come from **GEAR PRODUCTION HEADQUARTERS**



MICHIGAN TOOL
Company



7171 E. McNichols Rd. • DETROIT 12, MICHIGAN, U.S.A.



OUTSTANDING HIGH PRECISION . . . HORIZONTAL BORING,

You eliminate 60% WASTE WITH PROVEN **METCUT**

TWO-PIECE CORE DRILLS

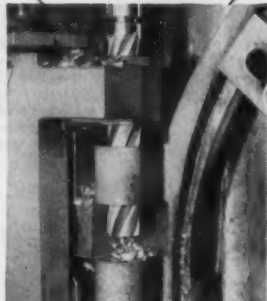
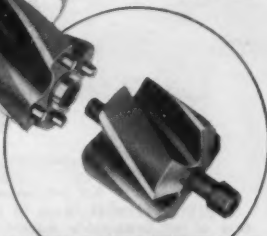
Quick-Change Replaceable Tips Cut Costs, Save Set-Up Time

Tested and proved over a two-year period, METCUT Pin-Mount Core Drills offer you substantial savings. Now you don't need to throw away 60% of your drills because they are not long enough to get through the bushings and work. You simply buy replacement cutters and re-use the tool bodies over and over again. You also save set-up time because cutters can be quickly and easily changed without re-adjusting spindles. You merely unscrew the retaining cap screw, remove the worn cutter, and place in the new tip. No drifts are required.

Sturdy Pin-Mount Design, Deep Flutes Equal Solid Drill Performance

Furthermore, cutting efficiency of the METCUT Core Drill is equal to solid drills. The deep flutes have as much as 60% more chip capacity than ordinary two-piece drills and permit single pass, straight-through drilling on deep holes. Sturdy pins provide accurate alignment and powerful drive. Flush fit eliminates problems of chip lodging or packing.

WRITE FOR BROCHURE . . . New brochure gives details and specifications on this cost-cutting tool. Ask for quotations. Sizes from $\frac{3}{4}$ " to 5" diameters are now available.



This 1½" METCUT Two-Piece Core Drill, used in drilling cast armor steel for a leading tank manufacturer, eliminates 60% tool waste. Replaceable cutters give big savings because 60% of core drill is needed to get cutting edge through the bushings and work.

Industry's Finest Standard & Special Cutting Tools



METAL CUTTING TOOLS, INC., 350 S. Water St., Rockford, Illinois

For more data circle 356 on Reader Service Card

August, 1957

modern machine shop 55

OUTSTANDING HIGH PRECISION . . . HORIZONTAL BORING, DRILLING & MILLING MACHINES

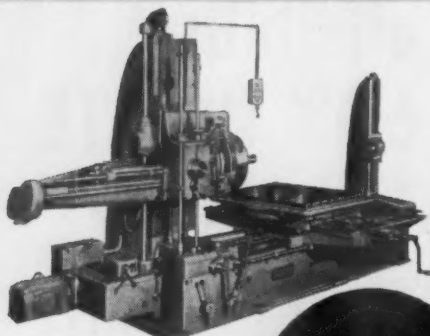


TABLE TYPE

BFT - 80
3 1/8" spindle diameter
Base price \$18,880.

BFT - 100
4" spindle diameter
Base price \$32,975.

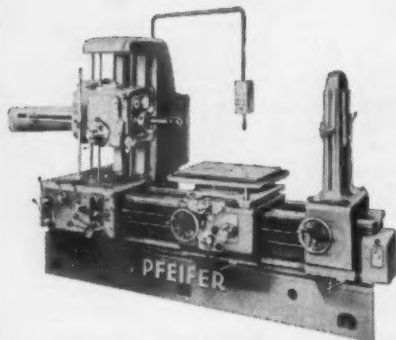
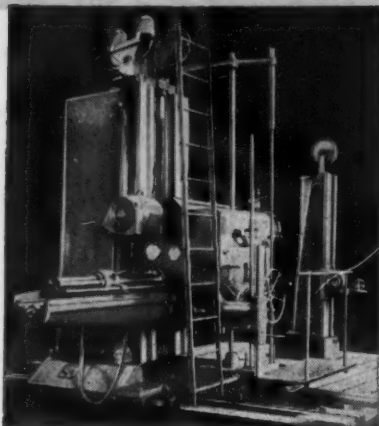
BFT - 125
5" spindle diameter
Base price \$43,880.

IMPERIAL

Power-saving drive ensuring full utilization of carbide-tipped tools. Very wide range of speeds and feeds to take care of all imaginable machining problems for smallest and largest working diameters. High-quality design of the bearing system for the inner and outer hollow spindle driven independently. All operating elements are neatly arranged, avoiding complicated switch-gear susceptible to trouble. Small manufacturing tolerances due to precision-scraped or ground guide-ways and highest accuracy of setting either by dial gauges or optical instruments.

FLOOR TYPE

BFP - 160
6 1/4" spindle diameter
Base price \$47,880.



SPINDLE HEAD—The spindle head is of rugged and compact construction.

TURNING—High degree of flexibility. Employed as a standard lathe and a facing lathe.

OPTICAL POSITIONING—The optical measuring equipment used in this machine furnishes readings easily and is easily understandable for the operator.

ACCURATE POSITIONING BY DIAL AND GAUGE BLOCKS.

TABLE—Rotating square, rotary table can be turned for one complete revolution. **MULTIPLE LENGTH AND CROSS FEED STOPS.**

MODEL FO
Base prices
from \$9,988.

PFEIFER

A A R O N
MACHINERY CO., INC.

Dept. M
45 Crosby St., N. Y. 12, N. Y.
Walker 5-8300

LIBERAL TERMS

RENTAL PLANS

• See Page 65

Branches at: Buffalo, N. Y.

Minneapolis, N. Y.

Los Angeles, Cal.

San Francisco, Cal.

**20,000
AIR GAGE
SPINDLES
at
LESS THAN
A DIME EACH**



ADJUSTABLE BALLJET SPINDLE KIT

In 5 minutes with this kit you can assemble a precision air gage spindle for any size hole between 1" and 3" diameter and with gage block accuracy. In increments of .0001", this kit gives you the equivalent of 20,000 gaging spindles at a cost of less than ten cents apiece—and not even one master setting ring is needed.

Exactly what is needed for short runs or to pinch hit in an emergency.

Get a free demonstration of Sheffield Adjustable Air Gage Tooling, or write to The Sheffield Corporation, Dayton 1, Ohio—Dept. 12.



**Ball Jet Spindle
assembled**



**Ball Jet Spindle
in use**

**Calibrating
Fixture**

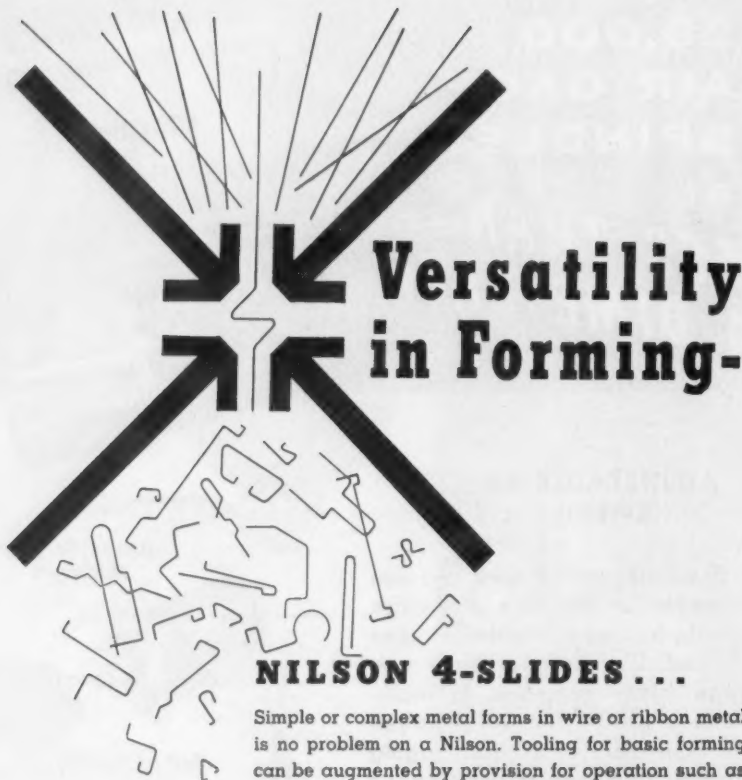


New Phone—Lincoln 5577

For more data circle 358 on Reader Service Card

August, 1957

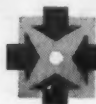
modern machine shop 57



NILSON 4-SLIDES...

Simple or complex metal forms in wire or ribbon metal is no problem on a Nilson. Tooling for basic forming can be augmented by provision for operation such as welding, assembling or swaging. Open design on all forming elements provides for quick tool change and easy adjustment even from wire to metal forming on the one machine that does so many jobs so well. The universal Nilson 4-Slide is the economical answer to your forming problems. Size ranges—wire up to ½" dia. in feeds to 32" max., ribbon stock up to 3½" wide. 5 to 75 ton press sections. Our specialists can assist you in all types of forming requirements.

THE A. H. NILSON MACHINE CO.
1514 BRIDGEPORT AVE. • SHELTON, CONN.



NILSON

For more data circle 359 on Reader Service Card

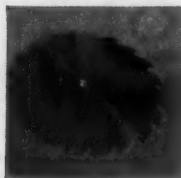
FOR HEINEMANN SAWS—

how
HEINEMANN
does it!

Saw blades are taken rough ground from surface grinders. They are placed on the magnetic rotating plate. The Brightboy Wheel oscillates back and forth across the surface of the saw.



**"a mirror-like BRIGHTBOY Finish,
unobtainable by any other form of polishing"**



BEFORE

Heinemann Saw before and after Brightboy polish



AFTER

The FINISHING Touch!

"The eye-appeal provided by Brightboy's unique working action plays an important part in selling our saws", says Mr. William Heinemann of nationally-known Heinemann Saw Corporation, Canton, Ohio. "It produces the superb finish which reflects the high skill of our craftsmen and our use of finest materials".

**For Manufacture and Maintenance
of Many Types of Tools**

A Single-Step BURRING, FINISHING, CLEANING, POLISHING OPERATION

Brightboy's ABRASIVE and RUBBER work simultaneously to achieve this 4-in-1 operation. Stock Brightboy numbers are match-mated to the tool and steel for any requirement of finishing. A Brightboy finish frequently constitutes the final polish.

**Readily Available: A WIDE RANGE OF
STOCK BRIGHTBOY SHAPES, SIZES
AND TEXTURES**

Wheels, sticks, rods and blocks for machine and manual operations come in Silicon Carbide and Aluminum Oxide grains from extra fine to extra coarse. Soft, firm, and tough rubber binders.

Practically limitless applications bring an entirely new, wider concept of abrasive uses. Ask your dealer for Brightboy's catalog listing grains, textures, applications, machine speeds. Write us if he cannot supply you or on any problem in which finishing is involved.



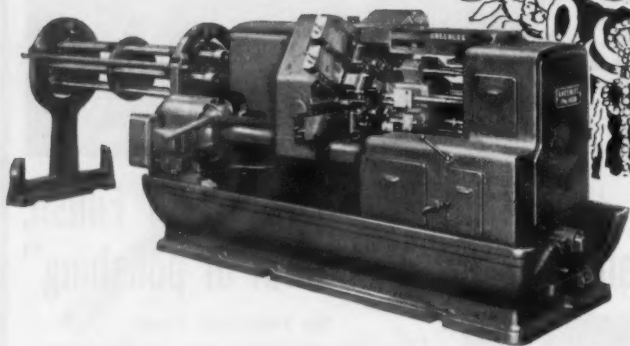
**BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.**

95 North 13th Street • Newark 7, N. J.

*America's Pioneer Manufacturer
of Rubber-Bonded Abrasives*

For more data circle 360 on Reader Service Card

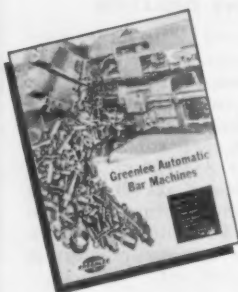
Magic?



No...Just Greater Flexibility!

GREENLEE AUTOMATIC BAR MACHINES

For Threading . . . Tapping . . . Reaming



The greater flexibility of Greenlee Automatic Bar Machines enables you to reduce idle machine time. Greenlee simplified camming results in fast setups for short-run jobs . . . long operations are easily split for more effective machining time. Investigate! Call in Greenlee Engineers for complete information.

Write today for catalog A-405. Please submit print when inquiring about a specific job.



GREENLEE BROS. & CO.
1838 Mason Avenue
Rockford, Illinois

For more data circle 361 on Reader Service Card



*A job-proved
Heller
line*

Heller

solid carbide

Tools

give more because they "give" less!

GREATER RIGIDITY PAYS OFF: There's no spring or wobble as with carbide-tipped steel tools. So, longer life, higher speeds and smoother finishes are built into Heller Solid Carbide Tools.

CHECK THESE SPECIFIC ADVANTAGES! Heller Solid Carbide End Mills produce much finer finishes than tipped types. Heller Solid Carbide Drills increase production 40 to 50 times over high speed steel drills because of higher speeds. Heller Solid Carbide Reamers last as much as 50 times longer than steel reamers cutting hardened steels at Rockwell C-63.

RESHARPENING SERVICE ADDS FURTHER LIFE! Heller regrinds dull tools to restore them to original precision ... at a fraction of their original cost.

COMPARE THE VALUE! Tested against high speed steel tools with or without carbide tips, Heller Solid Carbide Tools clearly prove that they cost much less in the long run.



Heller Tool Co.

NEWCOMERTOWN, OHIO
America's Oldest File Manufacturer A Subsidiary of Smonds Saw and Steel Co.

			
NICKEL SAW BLADES	METAL CUTTING BAND SAWS	FLAT GROUND DIE STEEL	FAMOUS HELLER FILES

HOLLER FOR HELLER for better cutting at lower cost!

Whether it's solid carbide tools or job proved files you want, it pays to consider Heller first. Oldest in filing experience, newest in cutting developments, Heller is best equipped to match cutting tools to job requirements for maximum production at minimum cost.

SOLD EXCLUSIVELY THROUGH



For more data circle 362 on Reader Service Card

For fast, economical cutting of flat metal shapes there are

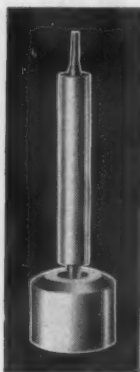
7 MODELS OF Campbell Nibbling Machines

...with cutting capacities ranging from 3/32" mild steel for **MODEL 0** machine to 1/2" mild steel for **MODEL 530**, in sheet sizes from 16" or less, to 72".

CAMPBELL NIBBLERS are making tremendous savings in time and money for hundreds of users in aircraft and other metal-working plants.

...in fast cutting of ferrous and non-ferrous sheet metals or composition sheets.

...for moderate production runs or experimental development work.



Economical
"throw-away"
punch and die

• CAMPBELL NIBBLERS cut from 40 to 60 times faster than drilling or filing. A fast-moving punch (350 to 900 strokes per minute) operating over a die, nibbles out the design, taking a small "bite" with each stroke of the punch.

...for any and all kinds of shapes

...for either inside or outside cuts

...with no distortion of material—no internal strains
—no invisible fractures—no burr

...with a "nibbled" edge that is sufficiently smooth
to require very little finishing and sometimes none

CAMPBELL standard punches are made double end to double work life and halve the cost. Prices are so low (starting at 40c each, or 20c per working end) that new punches cost less than regrounding dull ones.

Here is a quick picture of CAMPBELL NIBBLING MACHINE Capacities

Campbell Nibbler Model #	Sheet Width	WORKING CAPACITY		Strokes per Minute
		Sheet Thickness Mild Steel	Alloy Steel	
0.....	16"	3/32"	1/16"	900
1A.....	20"	3/16"	1/8"	375-650
430.....	60"	3/8"	1/4"	350-525
436.....	72"	3/8"	1/4"	350-525
530.....	60"	1/2"	5/16"	350-525
2524.....	48"	1/4"	3/16"	375-650
2536.....	72"	1/4"	3/16"	375-650



Send for this
catalog for com-
plete information
on this versatile
production and
experimental tool

Campbell Machine Division AMERICAN CHAIN & CABLE

931 Connecticut Avenue, Bridgeport 2, Connecticut

For more data circle 363 on Reader Service Card



WILSON "ROCKWELL"
THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

WILSON "ROCKWELL"
HARDNESS TESTERS



A FULL WILSON LINE
TO MEET EVERY
HARDNESS TESTING
REQUIREMENT

**FULLY
AUTOMATIC**

•
SEMI-AUTOMATIC

•
REGULAR

•
SPECIAL

•
SUPERFICIAL

•
**MICRO & MACRO
HARDNESS TESTERS**

For easy, accurate production tests

Sensitive and Accurate as a precision balance—the WILSON "Rockwell" hardness tester insures the quality of your products and protects your good name as a manufacturer.

Durable as a machine tool—WILSON "Rockwell" hardness testers withstand severe daily use with a minimum of service requirements.

A staff of WILSON hardness testing experts is available to help choose the model best suited to your job—and provide quick emergency service if it is ever needed.

Write for booklet DH-325 today



ACCO
for Better
Values

**Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE**

230-G Park Avenue, New York 17, N. Y.

For more data circle 364 on Reader Service Card

ACCO





Microsize FLEXLOC locknuts help you design smaller assemblies and fasten them securely

SIZE	Across Flats		Hex. Height	Across Corners		Height
	MAX.	MIN.	REF.	MIN.	REF.	
0-80 NF-3B	.111	.107	.046	.121	.075	
1-64 NC-3B	.127	.123	.056	.140	.090	
1-72 NF-3B	.127	.123	.056	.140	.090	
2-56 NC-3B	.158	.153	.067	.176	.105	
2-64 NF-3B	.158	.153	.067	.176	.105	
3-48 NC-3B	.190	.183	.071	.210	.120	
3-56 NF-3B	.190	.183	.071	.210	.120	
4-40 NC-3B	.190	.183	.071	.210	.120	
4-48 NF-3B	.190	.183	.071	.210	.120	

Standard microsize FLEXLOC locknuts are available in brass (plain or cadmium plated) and aluminum (plain or chemically treated) for temperatures up to 250°F; in alloy steel (plain or cadmium plated) and 18-8 stainless steel (silver plated) for temperatures up to 550°F.

FLEXLOC®

LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

For more data circle 365 on Reader Service Card

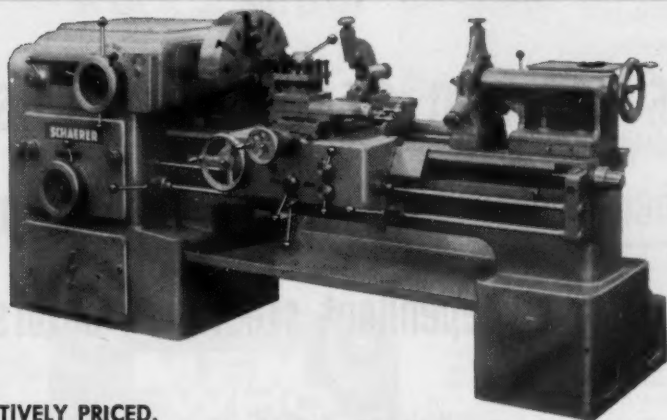


Microsize FLEXLOC locknuts save space and reduce weight in electronic equipment, instruments, servomechanisms, and other small assemblies in which weight and bulk are important design considerations. Microsize FLEXLOC locknuts are smaller and lighter than regular FLEXLOCs of the same nominal diameter. They permit smaller mating joints or flanges—with no loss in holding power or convenience of assembly.

Like regular FLEXLOCs, microsize FLEXLOC locknuts are of one-piece, all-metal construction. No inserts to pop out or deteriorate; nothing to put together, come apart or get lost. FLEXLOCs lock and stay locked wherever wrenching stops. You can use them as locknuts or stop nuts. Vibration will not loosen them and they can be used many times over.

For more information on microsize FLEXLOC locknuts (or microsize FLEXLOC self-locking clinch nuts), see your local FLEXLOC distributor or write STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

WORLD WIDE RECOGNITION FOR QUALITY and PRECISION!



ATTRACTIVELY PRICED.

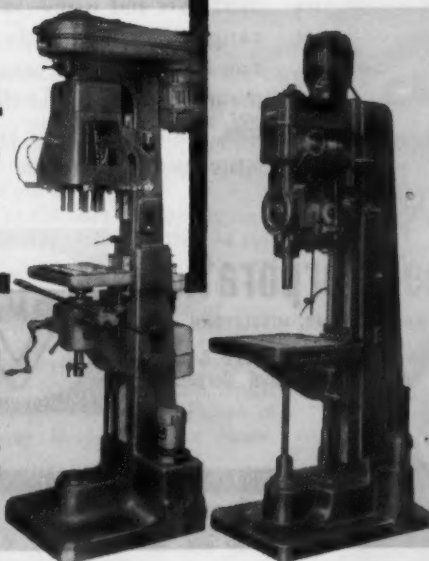
Featuring:

- **SADDLE AND APRON ARE CAST IN ONE PIECE AND RIDE IN UNDERSLUNG DOUBLE VEE WAYS.**
- Centralized lubrication.
- Underslung double V-guide bed, fully protected against damage, for long life.
- Automatic lubrication, easy maintenance, easy cleaning.
- Swing from 20" to 44"
Bed lengths to 35'

SCHAEFER LATHES

IMPERIAL DRILLING MACHINES

Spindles can be fixed
in any position,
circles, straight lines
or irregularly.
Spindles rotate
at different
speed ranges.



Featuring:

- All-gear transmission from shaft to spindle.
- Case-hardened, tempered ground gears.
- Automatic feed, with 4 normal, 4 rapid speeds.
- Instant-fixing, predetermined depth control.
- Ball and roller bearings throughout.

AARON

MACHINERY CO., INC.

DEPT. "M"

45 CROSBY STREET
NEW YORK 12, NEW YORK
WA 5-8300

Branches at: / Buffalo, N. Y.,
Mineola, N. Y.,
Los Angeles, Cal.

LIBERAL TERMS — RENTAL PLANS

See Page 56

GET ARMCO STAINLESS BARS when, where and how you need them ... from independent steel distributors

When you need Armco Stainless Steel bar stock and need it *now*, a call to your independent steel supplier can pay off. Same-day service is ordinary; delivery in hours is often possible.

Where do you need your stainless bar and wire? It's a fact that your independent supplier may be able to put steel where you need it faster than you could get it from your own inventory.

How much time must you spend and what will be the scrap loss before stainless bar or wire

from your inventory is ready to use? That's how much you'll save by buying steel *tailored* to your needs by your steel supplier.

Wide Selection

More than 30 standard and special grades of Armco Stainless Steel bars and wire—in a wide range of shapes, sizes and conditions—are available through independent distributors. There's one near you. Just write us for his name.

Armco Steel Corporation

2286 CURTIS STREET, MIDDLETOWN, OHIO

Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation



You c
nese t
ou ca
ne Do
ides y
Many c
Men
roduc
al of
ne fac
list o
cal di
LINC
ouble
ending
oper,
till A
LINC
320 N
mmons

work 2 shifts
simultaneously with
either the Kling
Combination or
Double Angle Shears



**MEN
WHO
KNOW**

CHOOSE

Kling

WORKHORSES

You can actually work 2 shifts on either of these two Workhorses. With the Combination, you can shear, punch, cope, miter, cut, etc. With the Double Angle Shears and its two cutting sides you can shear bars, rounds, angles, flats. Many can be done simultaneously.

Men who know expect this money-saving—production-increasing performance that is typical of all KLING Workhorse Machines... get the facts from these men. We'll gladly send you a list of users near you and the name of your local distributor.

KLING Workhorses include Rotary Shears, Double Angle Shears, Guillotine Shears, Angle Bending Rolls, Combination Shear, Punch & Oper., Plate Bending Rolls, Friction Saws, Mill All, etc.

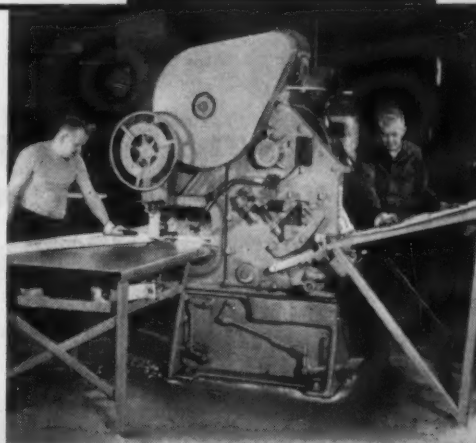
KLING BROS. ENGINEERING WORKS
320 N. KOSTNER AVE. • CHICAGO 51, ILL.

Export Distributor:

Immons Machine Tool Corp., 50 E. 42nd Street, New York 17

Exclusive Canadian Distributor:

Brown-Boggs Foundry & Machine Co. Ltd., Hamilton, Ontario



KLING COMBINATION

"Works 2 shifts in one." Men who know say: "For just a little more than the cost of a Shear or Punch alone, we get a machine that does the work of a half dozen machines."

"2 men can work simultaneously, each turning out totally different work."

Write for Bulletin 347



KLING DOUBLE ANGLE SHEARS

"Works 2 shifts in one". Men who know say: "Now 1 man can cut angles while another is cutting bars, simultaneously! And we can cut rounds or plates, whichever meets our needs best! Automatic hold-downs available in all models which range up in capacity to handle angles to 8" x 8" x 1 1/4".

Write for Bulletin DA-2345

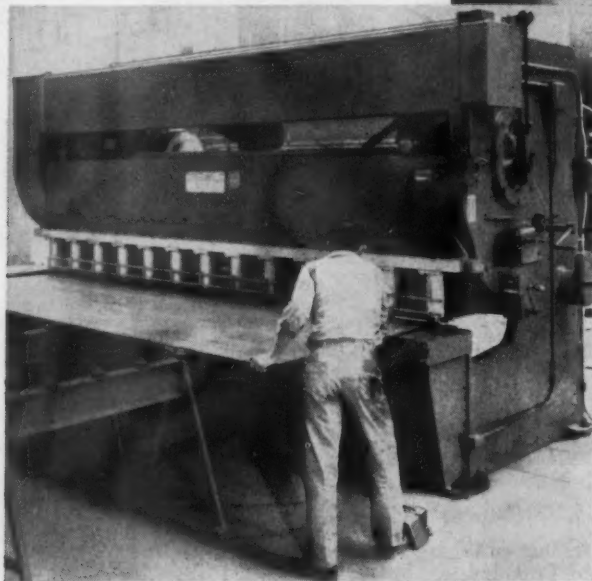


For The Best Cut, The **CORRECT** KNIFE CLEARANCE Must Be Used

Steelweld Shears are available for all thicknesses of steel to 2 inches and for lengths to 30 feet. Electric foot-switch operation, as illustrated, is furnished as standard equipment



In 10 seconds the knife clearance on Steelweld Shears can be adjusted to suit the thickness of metal being cut. It's merely a matter of turning a hand crank until the gauge pointer is on the proper figure.



**Table of
Recommended
Knife Clearances**

Gauge	Steel	Stainless
10	.012	.007
8	.014	.009
3/16	.016	.010
1/4	.021	.014
5/16	.027	.018
3/8	.032	.022
1/2	.043	.029
5/8	.053	
3/4	.064	
7/8	.075	
1	.086	

FOR every plate thickness there is a definite space or clearance between the knives that will produce the best result. When cutting different thicknesses of metal, it is necessary to vary the knife clearance accordingly.

One of the important differences between Steelweld Pivoted-Blade Shears and all others is the ease with which the knife clearance can be adjusted on Steelwelds. With most shears this is a major operation involving the use of measuring devices and requiring a great deal of time. Steelwelds were designed to make this adjustment simple, easy and fast. Hours of work are not required, in fact, the adjustment for any plate thickness can be made in 10 seconds.

Obviously there is no need to shear with some compromise knife clearance setting when you have a Steelweld Shear. You do not have to

accept any average cut when with such little effort you can have the best possible cut every time—sharp, straight, accurate with minimum burr. And then, too, remember that knives stay sharp longer when the proper clearance is used.

Easy knife adjustment is only one of many fine features that you will like in Steelweld Shears. For all thicknesses of plate up to 2 inches, for all lengths to 30 feet, you will find Steelwelds have much to offer.

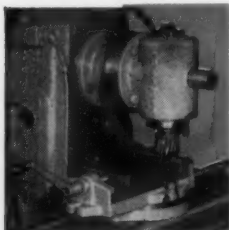
Write for free copy of Catalog No. 2011.

Gives construction and engineering details

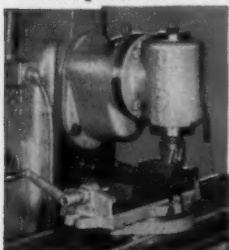
STEELWELD
PIVOTED
BLADE **SHEARS**

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 6455 E. 282 St. • Wickliffe, Ohio

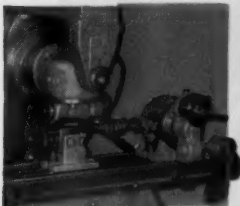
For more data circle 369 on Reader Service Card



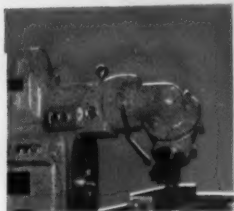
Heavy Duty Vertical
Milling Attachment



Heavy Duty Offset
Vertical Milling Attachment



Universal Milling Attachment

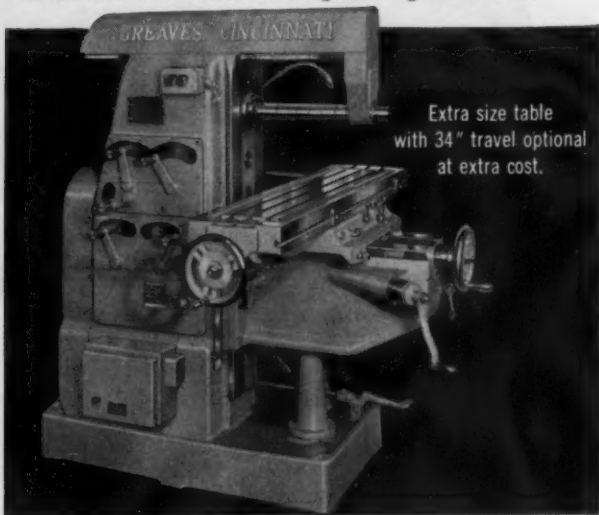


Toolmakers Overarm

Heavy duty attachments increase versatility of dependable, low-cost **GREAVES MILLS**

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS. Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table
 with 34" travel optional
 at extra cost.

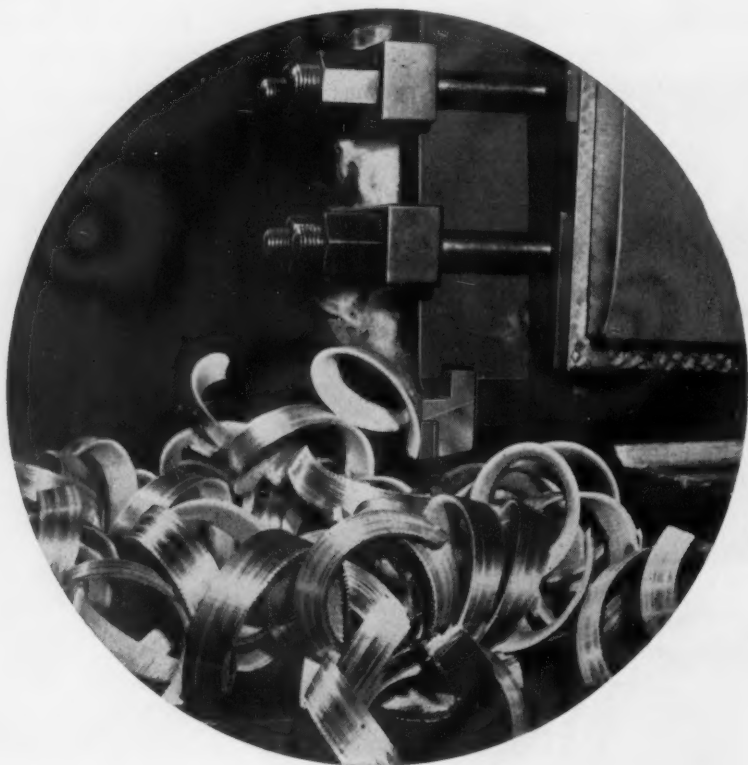
GREAVES MACHINE TOOL CO.
 2700 Eastern Avenue, Cincinnati 2, Ohio

Send Comparison Chart. I will make my own comparison of GREAVES MILLS with other makes.
 Send information on Attachments and Accessories for GREAVES MILLS.

NAME _____ TITLE _____
 FIRM _____
 ADDRESS _____
 CITY _____ ZONE _____ STATE _____

Send coupon for
 FREE Comparison
 Chart and detailed
 descriptive literature
 on easy-to-use
 attachments.

For more data circle 370 on Reader Service Card

speeds for carbides plus heavy-cut efficiency

low range to 100 fpm . . . for extreme depths of cut and maximum feeds

medium range to 150 fpm . . . for average cuts in medium steel or cast iron

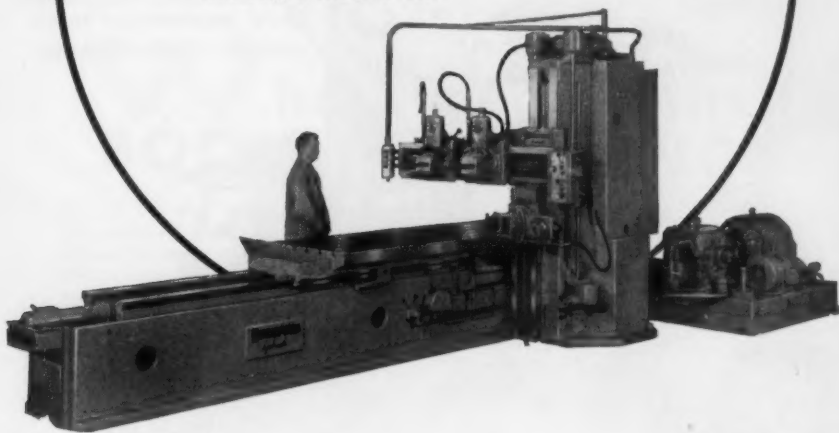
high range to 300 fpm . . . for carbide planing of steel and non-ferrous metals

with triple circuit **h3** drive

The new heavy duty Model OGN Hydraulic Shaper-Planers are equipped with triple circuit h3 drive to combine the ruggedness and cutting efficiency of single circuit planers, with the speeds required for carbide planing. Three distinct ranges of cutting speed are provided, with power inversely proportional, to give the correct combination of speed and force to most economically machine any metal.

Hydraulic drive is ideally suited for carbide tooling, since optimum cutting speeds can instantly be set for any tool. Tools also enter the cut more smoothly with hydraulic drive to reduce the tendency for fracturing brittle carbide tips.

A Rockford Machine Tool Co. representative can demonstrate these advantages for you. Ask your local dealer for full details, or write us for a copy of Bulletin No. 1200.



ROCKFORD MACHINE TOOL CO.
2600 KISHWAUKEE STREET • ROCKFORD, ILLINOIS



For more data circle 372 on Reader Service Card

SUNDSTRAND AVIATION
stabilizes
bearing components
with Cincinnati
Sub-Zero



Absolute stabilization of vital steel and bronze bearing components helps insure the dependability of SUNDSTRAND AVIATION parts.

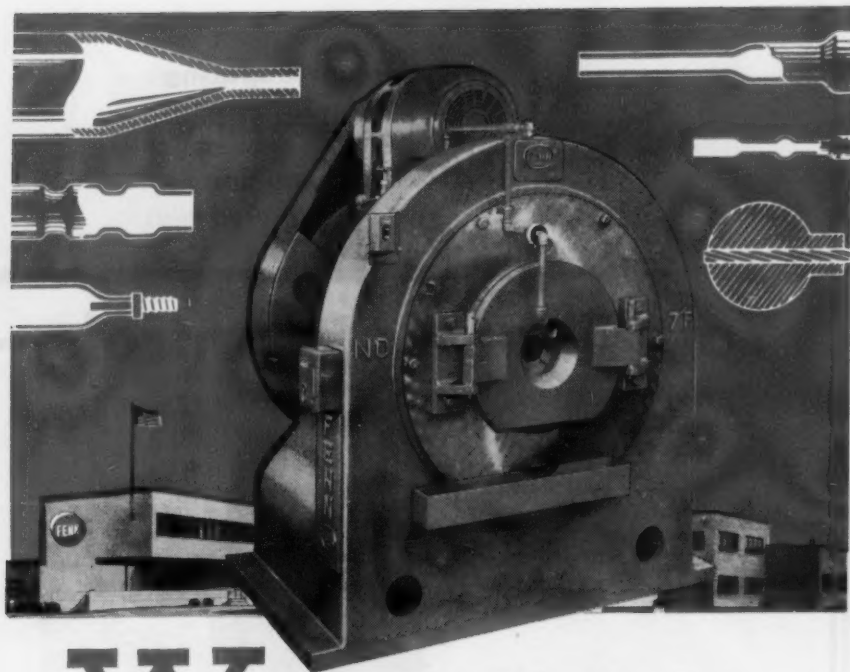
Aircraft bearing parts are "quick-aged" . . . toughened . . . and stabilized in a CINCINNATI SUB-ZERO 7SR-120-26 Chilling Unit which affords SUNDSTRAND high capacity in minimum floor space. They also like the advantage of faster heat control with the Convection Fluid Agitator, which effectively reduces chilling time.

Write today for the free complete-line catalog . . . or outline your own special low-temperature requirements for a no-obligation survey.

Cincinnati
Sub-Zero
Products

GENERAL OFFICES and PLANT
3930 S-7 READING ROAD
CINCINNATI 29, OHIO

For more data circle 373 on Reader Service Card



What's behind the BOOM to SWAGING?

Plenty . . . in these days of intense competition, higher costs of capital equipment, labor and materials. Cost-conscious production men are finding it far better and cheaper to swage many parts they formerly machined. Fenn's development of the Rotary Swager has produced a dependable, low cost precision production machine for reducing, pointing, tapering, sizing, assembling, bonding and forming ID contours . . . with tolerances to within $\pm .001$. To be sure that you are not machining when you should be swaging, send for Fenn's fact-filled Swaging Catalog No. SM56.



ROTARY

Swaging Machines

THE FENN MANUFACTURING COMPANY • 904 FENN ROAD • NEWINGTON, CONNECTICUT

For more data circle 374 on Reader Service Card



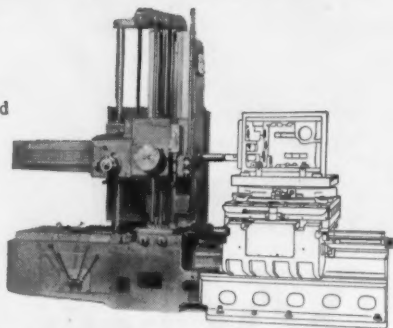
**Select
a Lucas**

**for accurate spacing
for precision boring
for heavy milling**

Your choice of controls —

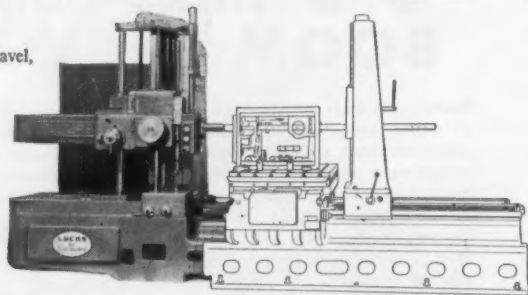
STANDARD LEVER CONTROLS

available for use with both short bed
or backrest models.



FULL PENDANT CONTROL

of feeds, speeds and directional travel,
optional on any Lucas.

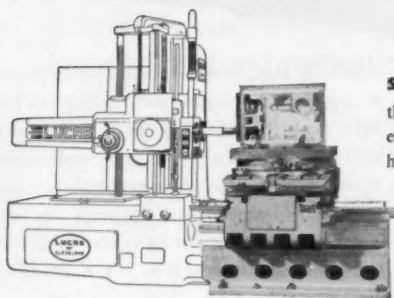


Whether you do line or stub boring, whether you prefer lever or automatic pendant control, you get the basic advantages of automatic power positioning and 4-way beds. Whichever model you

select you get the benefit of continuing design improvement, backed by 57 years of specialization and leadership in this field *plus* the full resources of The New Britain Machine Company.

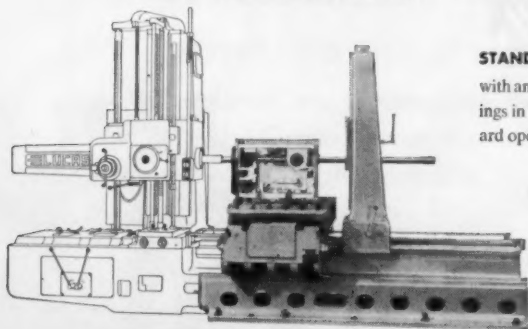
in production
 in the tool room
 in experimental work
 in engineering research
 in maintenance applications
 or several, in combination

your choice of beds



SHORT BED MODELS

the most compact and economical equipment for precision stub boring, heavy milling and horizontal drilling.



STANDARD BED WITH BACKREST

with anti-friction bearing mounted bushings in backrest block, handles all standard operations including line boring.



LUCAS MACHINE DIVISION

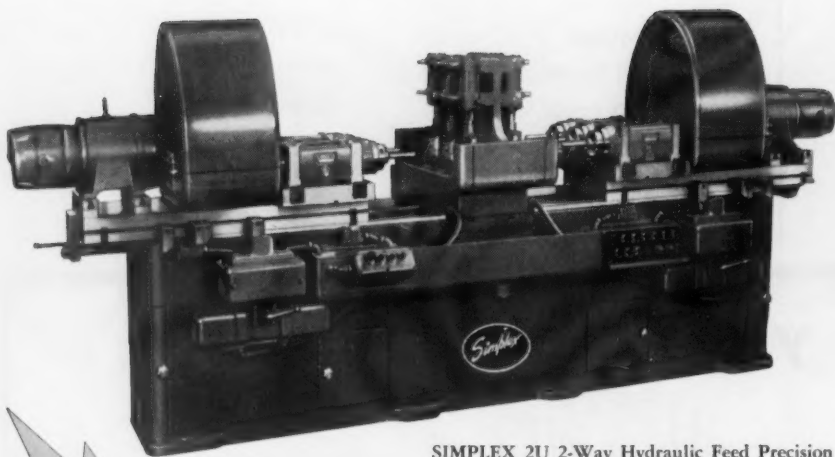
The New Britain Machine Company
Cleveland, Ohio

OTHER NEW BRITAIN MACHINE TOOLS DIVISIONS

New Britain-Gridley Machine Division
New Britain, Connecticut

Hoern & Dilts Division
Saginaw, Michigan

For more data circle 376 on Reader Service Card

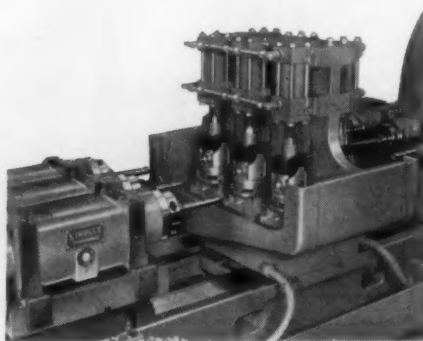


25 YEARS
1932 - 1957
Simplex

PRECISION BORING MACHINES

Hydraulically clamped type work-holding fixture designed to hold six pistons. The piston pin holes are semi-finish and finish bored at the rate of approximately 400 per hour at 100% efficiency.

SIMPLEX 2U 2-Way Hydraulic Feed Precision Boring Machine complete with six #2 SIMPLEX self-contained automatically lubricated precision boring heads and a platen type work-holding fixture designed to hold six pistons for semi-finish and finish boring of the wrist pin holes. The electrical and hydraulic system on this machine is made to conform to J. I. C. Standards.



SIMPLEX MACHINE TOOL CORPORATION

4540 WEST MITCHELL STREET
MILWAUKEE, WISCONSIN

PRECISION BORING MACHINES • PLANNER TYPE MILLING MACHINES
SPECIAL DRILLING, TAPPING AND BORING MACHINES

For more data circle 377 on Reader Service Card

FINE CUTTING TOOLS*by Eclipse*

Since 1913 Eclipse has been consistently and conscientiously serving many companies in widely diversified fields of production.

Each of these companies has found that "Engineered by Eclipse" is assurance of genuine quality in end cutting tools.

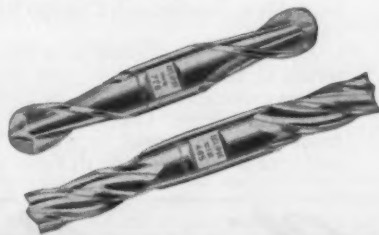


- High Speed Steel Cutters
- Carbide Tipped Cutters
- Core Drills
- Inserted Blade Cutters
- Multi-Diameters
- Back Spotfacers

and remember . . .

Eclipse now has a complete line of Precision End Mills. Ground from the solid, Eclipse End Mills insure longer tool life, finer finishes and lower production costs.

- Write for Counterbore Cat. No. 51 *
- Write for End Mill Cat. No. 56 **

**ECLIPSE COUNTERBORE COMPANY**

DETROIT 20, MICHIGAN

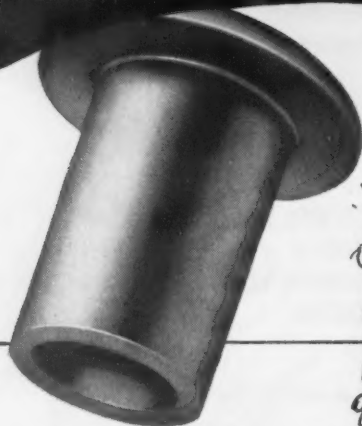
END MILL DIVISION—NORTH BRANCH, N. J.

ADDRESS
(BOX 97, RARITAN N. J.)

*For more data circle 378 on Reader Service Card **For more data circle 379 on Reader Service Card

Back of a *Chicago Rivet*

Is an Organization That Really Serves



There are
CHICAGO RIVET
machines that will set

- 1
- 2
- 3
- 4
- 5
- 6

Tubular or Split
Rivets At a Time

The RIGHT rivet, plus the RIGHT riveting machine will
produce a fastened assembly at the RIGHT low cost

The correct combination of rivet and machine requires expert knowledge available to you through Chicago Rivet engineers.

Anticipated production, type of materials to be fastened, assembly shape and its expected service life are factors to be considered. Decisions must be made on a rivet metal or alloy. Type and size of rivet, shape of head and

shank, depth of tubular section must be all determined. Are indexing fixtures and multiple setters indicated? Can a standard rather than a special rivet be used? These are the type of questions Chicago Rivet Engineers are daily answering for industry. Their recommendations are available to you without cost. We suggest you send a blueprint or sample assembly with your inquiry.

Chicago Rivet & MACHINE CO.

963 South 25th Avenue
Bellwood Ill. (Chicago Suburb)
Branch Factory: Tyrone, Pa.

FOR YOUR FILES

Rivet catalog describing 1388
standard tubular and split
rivets and 26 single and
multiple automatic rivet setters.



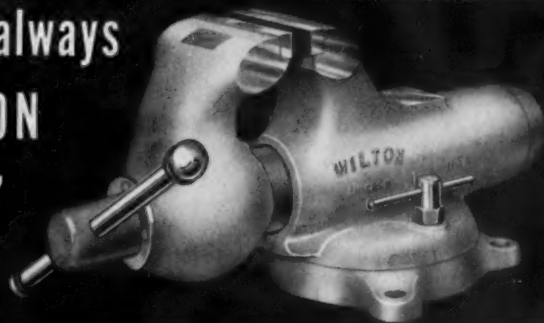
For more data circle 380 on Reader Service Card

*For more data circle 378 on Reader Service Card **For more data circle 379 on Reader Service Card
August, 1957 modern machine shop 77

"I BUY ON COLD, HARD FACTS!"



...and he always
buys WILTON
Machinists'
Vises!



You've met him. Calculating Cal, the walking slide rule. Last time he smiled was at his mother-in-law's funeral. Still wears a celluloid collar. A real hard buyer, one that can't be swayed by anything but facts. He softens up, though, when he hears the Wilton Machinists' Vise story . . . 68% more strength . . . 54,000 psi malleable castings in stressed parts . . . permanent lubrication . . . interchangeable jaws . . . 360° rotation with double lock nuts . . . lower replacement costs . . . more working advantages . . . used and preferred by the leaders of industry . . . COST NO MORE than ordinary vises . . . and, to clinch the sale,

WILTON'S UNCONDITIONAL FIVE YEAR GUARANTEE! Selling is seldom easy, but you always have the edge with Wilton, because you have more to offer:

BETTER PRODUCT, COMPETITIVE PRICES, AND THE STRONGEST VISE GUARANTEE EVER OFFERED!

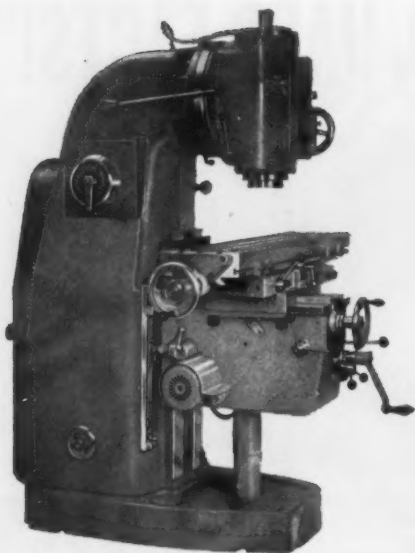
That, plus Wilton's "Square Deal" distributor policy is what makes it so profitable to sell Wilton Machinists' Vises, and the complete line of Wilton tools.

WRITE FOR NEW FREE CATALOG!

WILTON TOOL MFG. CO., INC.

SCHILLER PARK, ILLINOIS

For more data circle 381 on Reader Service Card



Model VF-54 Vertical Miller

- Standard Duty #2 (Model 54) ALL-GEARED Millers—Plain, Universal and Vertical—table 52" x 11", 7½ HP with power feeds (longitudinal 33½"), and power rapid traverse.

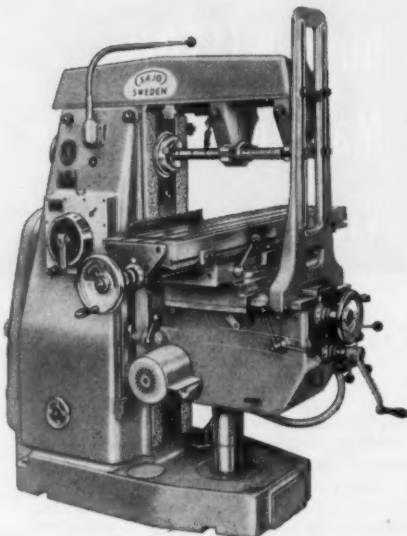
Also available as Plain
and Universal Millers:

- Light Duty #2 (Model 53) ALL-GEARED Miller—3½ HP with power feeds (longitudinal 24½").
- Light Duty #2 (Model 48) UTILITY Miller—3½ HP with power feeds, longitudinal (24½") only or in 3 directions.

SAJO MILLERS HORIZONTAL AND VERTICAL

SAJO MILLING MACHINES
are built to U. S. standards
by Swedish craftsmen.

Model PF-54 Plain Miller



Literature and installations in your area on request.

austin industrial corporation
76-H Mamaronock Avenue • White Plains, N. Y.

For more data circle 382 on Reader Service Card

RADIAC®

TYPE "JH" ABRASIVE CUT-OFF MACHINE

FOR WET CUTTING ONLY

**CUTTING HEAD OPERATES
EITHER MANUALLY OR
HYDRAULICALLY - - WITH
VARIABLE FEEDS & STROKES**

**Increases production
through ease of operation**

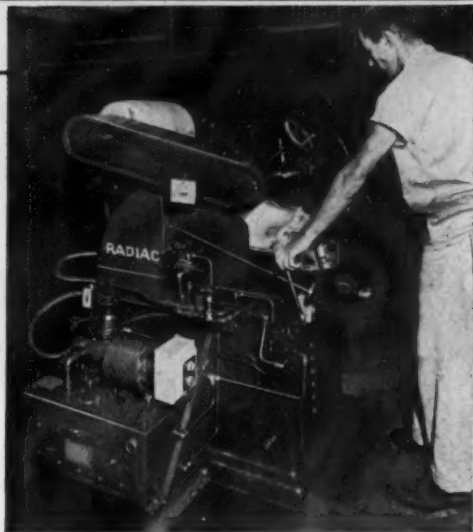


Photo through courtesy of Standard Pressed Steel Co., Jonkintown, Pa.

Operated by a 10 H.P. Motor and using an 18" Rubber Bonded RADIAC Abrasive Blade, this de Sanno Type "JH" Abrasive Cut-off Machine introduces new production economies and operating efficiency. Its hydraulically operated cutting head reduces operator fatigue. It features a foot treadle for operating the work vise, and an emergency reversing rod with mushroom button. Specially designed for production cutting of steel bars up to 2½" D., and tubing up to 4" O.D.

There are 10 other types of RADIAC Cut-off Machines—and a complete line of Abrasive Cut-off Blades—to meet your specific requirements. Write for illustrated Bulletin today. Exclusive dealers located throughout the United States.

Use RADIAC Blades with RADIAC Machines

A. P. DE SANNO & SON
INCORPORATED

**PHOENIXVILLE
PENNA., U.S.A.**

Manufacturers of Abrasive Cut-off Machines • Abrasive Cut-off Blades • Grinding Wheels

For more data circle 383 on Reader Service Card

Taft-Peirce gives three ways to...
PUT EXTRA "LIFE-VALUE" IN YOUR GAGING
FOR LOWER COSTS, HIGHER STANDARDS



Taft-Peirce offers one-source selection of four special materials which make your gaging dollar go much further.

Electrolized, Carbide, Norbide, and chrome plating have characteristics which greatly extend gaging accuracy and wear under different conditions. Electrolized, for example, means the gage has an even film of hard, tough non-magnetic alloy — only .000025" thick — on all gaging surfaces, providing an exceptional wear resistance.

Get Taft-Peirce extra "Life-Value" on your next order. If you want to reduce gaging costs — and promote higher standards at the same time — Taft-Peirce will be glad to use its experience to recommend special surface or material selection. This T-P extra "life-value" will more than pay for itself . . . in better parts inspection and smarter gage buying. For complete listing and prices of Taft-Peirce Fixed Gages, ask for The T-P Handbook.

ELECTROLIZED

A & B. Limit thread plug gages and cylindrical plug gages are available with individual handles or double-ended. Furnished in Taper Lock, Trilock or Reversible design. Bonus value comes from extreme surface smoothness which reduces friction. Also highly corrosion resistant.

CARBIDE AND NORBIDE

C. All types of cylindrical plug gages can be furnished from Norbide. Extreme hardness imparts long wear resisting qualities.

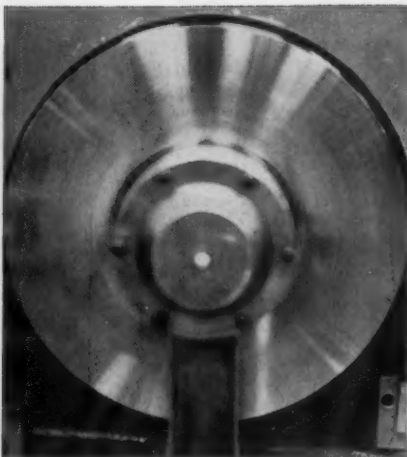
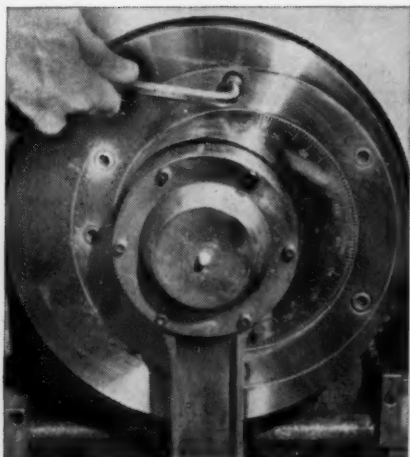
D. Norbide Ring Gages are particularly suited for accurate inspection of highly abrasive materials or large quantities of parts.

E. Adjustable Snap Gages can be furnished with gaging members faced with tungsten carbide, tantalum carbide or Norbide for extra wear resistance.

TAKE IT TO TAFT-PEIRCE

THE TAFT-PEIRCE MANUFACTURING COMPANY
 WOONSOCKET, R. I.

For more data circle 384 on Reader Service Card



Self-locking UNBRAKO socket screws keep critical adjustments secure in the eccentric drive mechanism of this fatigue testing machine. Drive system delivers varying loads up to 15,000 pounds force to equipment under test at 1050 cycles per minute.

Vibration won't loosen self-locking UNBRAKO socket cap screws

Screws with Nylok® device permit adjustments, keep precise settings during long test runs

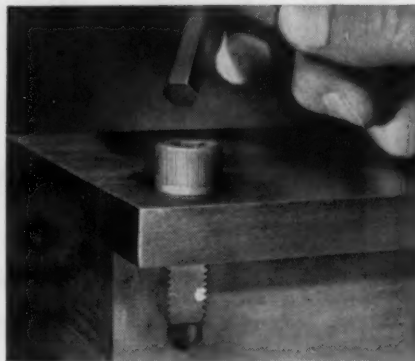
UNBRAKO socket screws with the Nylok self-locking device stay tight under constant vibration.

Take the eccentric drive system in the fatigue testing machine illustrated above, for example. This machine must frequently run for periods up to 2 weeks or longer, day and night, to complete a single test. Loosening of the screws which are used to adjust the tension-setting mechanism could not only cause damage to the machine, but also make the test data worthless. Self-locking UNBRAKO socket head cap screws eliminate such problems.

An UNBRAKO socket screw with the Nylok self-locking device is a single unit. Just screw it into any tapped hole. Seated or not, it locks positively wherever wrenching stops. Constant vibration or pounding, or endless running of a machine, won't affect these self-locking UNBRAKOS. The screws will not work loose!

Write today for your copy of Form 2193, which gives complete catalog and technical data on the complete line of UNBRAKO socket screws with the Nylok self-locking device. Or see your authorized industrial distributor. Unbraiko Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

For more data circle 385 on Reader Service Card



HOW IT LOCKS. The tough, resilient Nylok locking pellet keys itself into the mating threads. It forces threads together, and locks the screw securely—whether or not the screw is seated.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION

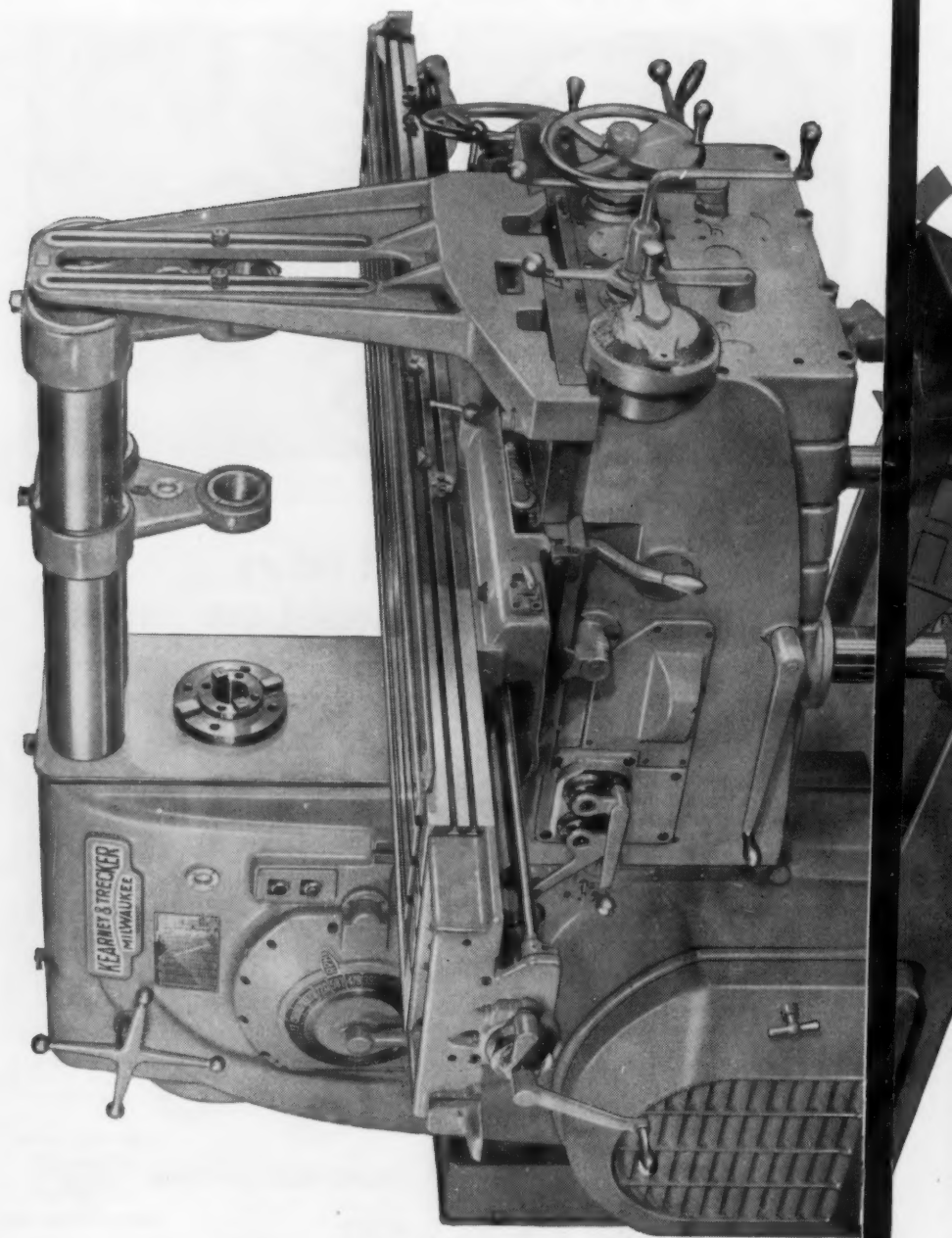
SPS

Jenkintown Pennsylvania

U.S. PAT. OFF.,
THE NYLOK CORP.

August, 1957

modern machine shop 83



On all **TF** series

*heavy-duty, knee-type
milling machines!*

Exclusive



twin elevating screws

INCREASE ACCURACY 3 TIMES

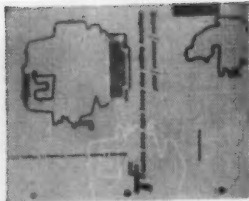
over single screw designs



**Designers and Builders of
Precision and Production Machine Tools Since 1898**

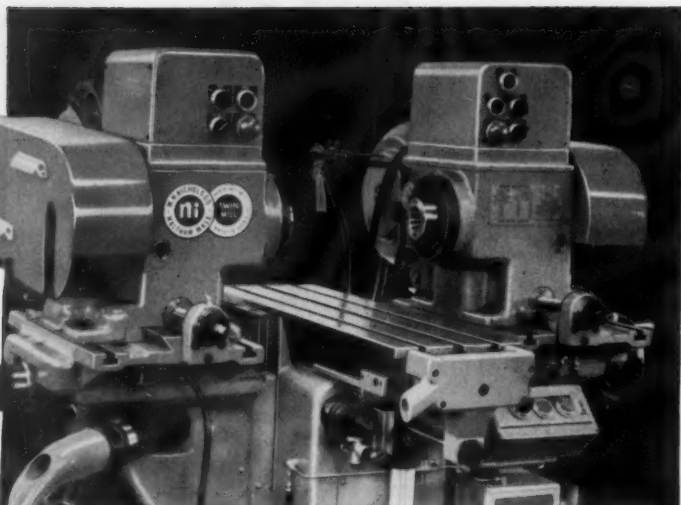
Want Proof?

We'd like to show you.
Write for Bulletin TF-57 on
your letterhead.
KEARNEY & TRECKER CORP.,
6794 W. National Ave.,
Milwaukee 14, Wis.



For more data circle 386 on Reader Service Card

Twin Mill



NICHOLS MILLERS...

Ideal Basic Machines for Automatic Production

NICHOLS MILLERS are versatile, work-devouring machine tools, unexcelled in accuracy and fine workmanship.

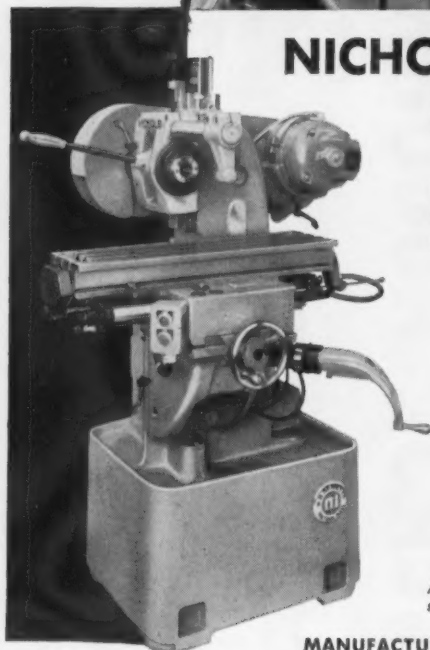
The TWIN MILL is practically TWO milling machines in ONE. Opposed Milling Heads have SIX-WAY adjustability for quick set-up and flexible approach to complex light milling operations. Push a button, and an automatic table cycle gives you TWO completed milling cuts. This unique duplex Miller is a cost-cutter without equal!

For high production precision milling where the double-barrelled approach of the TWIN MILL is not required, there are single spindle NICHOLS Semi-automatic Millers of varying work ranges. In addition to automatic table cycles, synchronized automatic down-feed of spindle head and automatic cross feeds are available.

NICHOLS MILLERS have a magnetic attraction for the Tool Engineer's ingenuity.

Write for literature and illustrations.

A NEW 16 mm. sound, color movie is available for free showing. May we reserve it for you?



Nichols BSA
Semi-automatic



MANUFACTURED BY W. H. NICHOLS COMPANY

National Distributors **THE ROBERT E. MORRIS COMPANY**

R E M SALES DIVISION

5004 FARMINGTON AVENUE • WEST HARTFORD 7, CONN.

For more data circle 307 on Reader Service Card

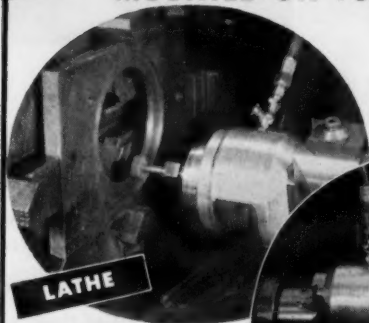
REDUCE Precision Hole Grinding Costs USING AN

Onsrud[®]

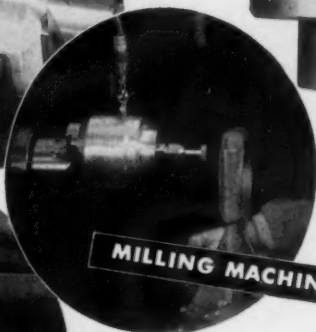
D1-S

HOLE GRINDER

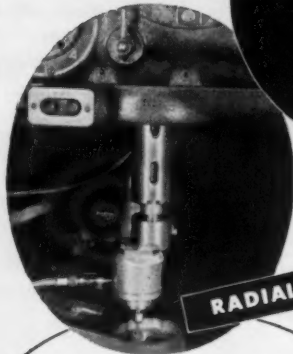
MOUNTED ON YOUR



LATHE



MILLING MACHINE



RADIAL DRILL

OR MOUNT ON JIG BORER
TO CONVERT MACHINE
TO PRECISION
JIG GRINDER



1/4 HP
50,000
RPM
AIR
TURBINE
GRINDER
•
SLIDE
ADJUSTS
TO
0.0001"

Grind precision holes at amazingly low costs with the D1-S . . . using your present machine tools. A completely RIGID unit guaranteed not to deflect in its vertical alignment. Grease-shielded, long life bearings. Capacity up to 2 3/4" diameter with 3/4" wheel . . . and up to 4" diameter with adapter. Proper high speed and power for dependable, fast operation with toughest steels.

ONSRUD MACHINE WORKS, INC.
PORTABLE TOOL DIVISION
3924 PALMER ST., CHICAGO 47, ILL.

WRITE FOR FREE D1-S HOLE GRINDER BULLETIN 1126

For more data circle 388 on Reader Service Card

HARDINGE
ELMIRA, N.Y.

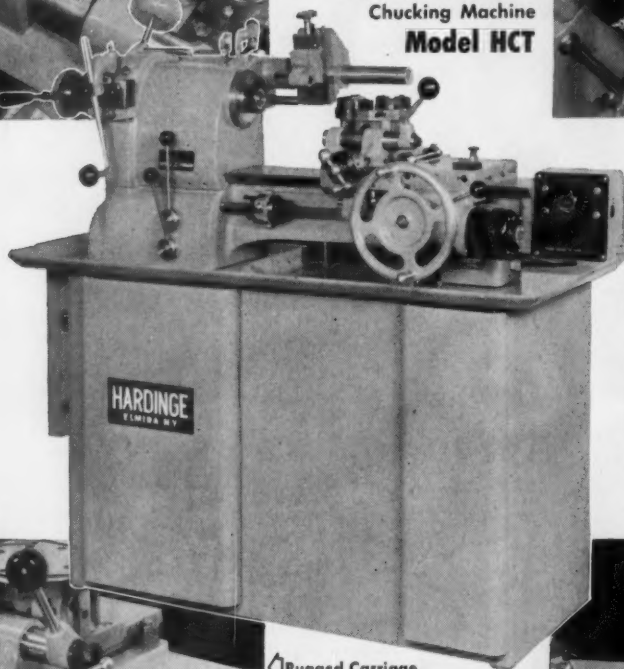
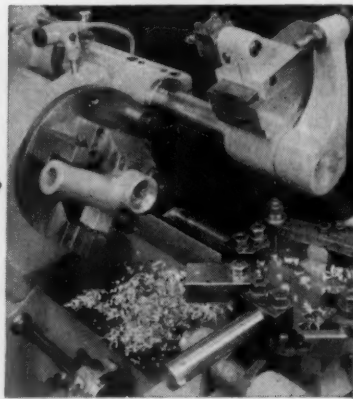
"Closer Tolerances Increase Demand for the HARDINGE HCT Precision Chucking Machine"



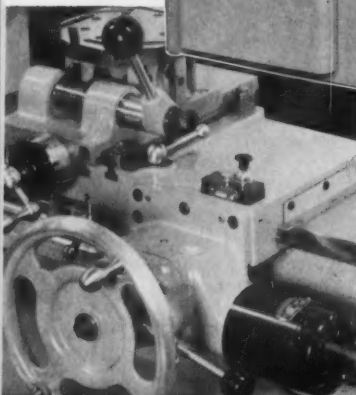
◀ 8-Station Turret

Flexible Range of Operation ▶

High Speed Precision
Chucking Machine
Model HCT



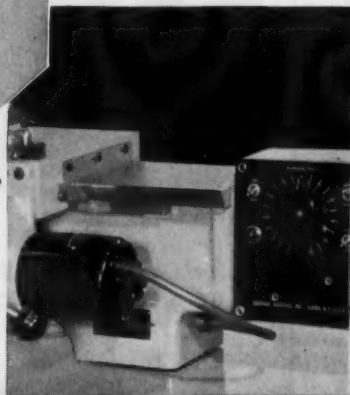
Hardinge Model HCT Precision Chucking Machine finishes diameters, recesses, shoulders, back faces, front faces, and cuts precision threads in one setting — all concentric with each other. Tooled inexpensively with standard tool bits.



◀ Rugged Carriage

Independent Variable
Carriage Feed ▶

For complete
information
write for
Bulletin HCT



HARDINGE BROTHERS, INC., ELMIRA, N. Y.

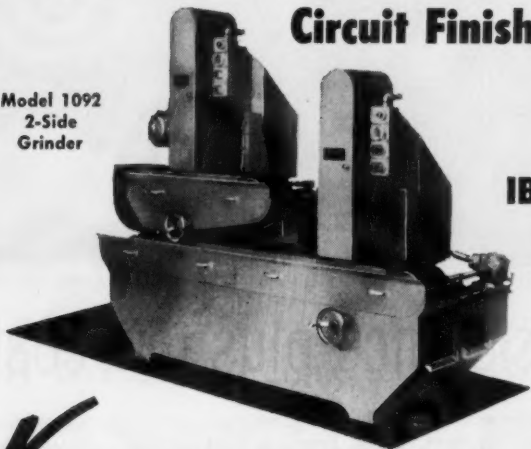
PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

ENGELBERG Two-Side Grinder Cuts Printed Circuit Finishing Time by

93% for

IBM SAGE Computers!

Model 1092
2-Side
Grinder



The Original Operation



Solution to IBM'S Problem:
The Model 1092 Two-Side
Grinder

✓ An Engelberg conveyor-type abrasive belt grinder has multiplied production by sixteen — and virtually eliminated rejects — on a finishing operation at the Kingston, N. Y. plant (Military Products Division) of International Business Machines Corp.

Here the I.B.M. SAGE Computer is produced for the U.S. Air Force. To produce printed circuits for this computer, perforated phenolic sheets are copper clad on both sides, then coated with graphite. Excess graphite remaining on the two surfaces must then be removed.

Previously, the sheets were sanded under water by a pneumatic, oscillating hand sander. Sixteen man-hours were required to meet daily production.

Using a 240-grit belt, the Engelberg Model 1092 (described at right) removes .0001" on one pass . . . flips the sheet . . . removes .0001" from the other surface . . . all in a single cycle. The graphite coating remains only to coat the walls of the holes pierced in the part.

This high-production, semi-automatic abrasive belt machine gives precision finishing to close tolerances on both flat surfaces of any ferrous, nonferrous, plastic or other materials. Piece-work first passes under grinding head at left, then is carried around to bottom conveyor belt with unground face up, positioned for passage under second grinding head at right.

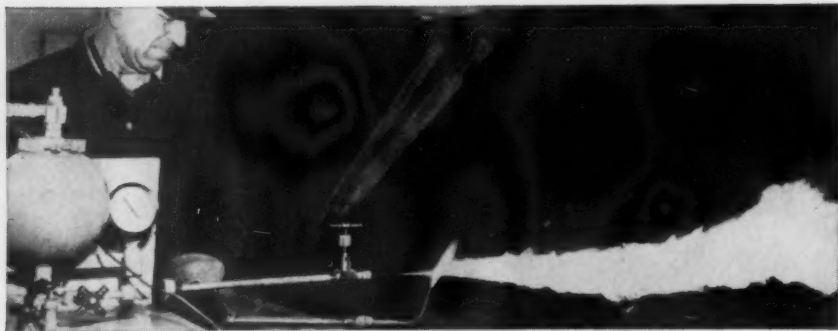
For complete information on this and other Engelberg Abrasive Belt Grinders consult your Sweet's Catalog or write . . .

ENGELBERG

The ENGLEBERG-HULLER Co., Inc.
101 Seneca St., Syracuse, N. Y.

PRECISION ABRASIVE-BELT GRINDERS

For more data circle 390 on Reader Service Card



Mineral oil hydraulic fluid instantly ignites upon torch flame contact

Fire resistance plus low cost

For many years costly industrial fires involving hydraulic fluids have been frequent, causing a need for an inexpensive, fire-resistant hydraulic fluid.

Shell Research Laboratories spent over four years in laboratory and field testing before such a fluid was developed. The result was Irus* Fluid 902... the first low-cost, oil-base fluid that, under plant conditions, actually snuffs out fire.

The new formulation is a specific emulsifying combination of petroleum oils and water. It gains its fire resistance through a relatively high water content. Irus Fluid adapts perfectly to most hydraulic systems. The following report is typical.

Typical Problem and Solution

A prominent automotive manufacturer, employing 100 hydraulically operated electric welders, formerly used a straight mineral oil fluid. Once damaged fluid lines allowed this

oil under pressure to spray onto the welding area. Sparks ignited the fluid... caused an immediate flash fire which resulted in 75% machinery damage. Immediately after the changeover was made to Shell Irus Fluid 902. Shortly thereafter a line broke and the high-pressure spray once more contacted welding sparks. There was no fire at all... and in a matter of minutes the machinery was operating at full efficiency.

The photos above provide dramatic proof of its flame resistance. On the left, conventional hydraulic fluid instantly ignites upon contact with an oxy-acetylene torch flame, whereas Shell Irus Fluid 902 (right photo), under the same conditions, does not support combustion beyond an inch or two from the flame. Under plant conditions, it actually snuffs out fire!

Two-Way Economy

Another advantage is the low cost of Irus



A leak is quickly spotted because of Irus Fluid's distinctive yellow color.



Complex cable lines necessitate a fire-resistant hydraulic fluid to eliminate fire hazard.



Under the same conditions, Shell Iru Fluid 902 clearly demonstrates its fire resistance

in a new hydraulic fluid

Fluid 902. Many plant operators find that Iru Fluid costs up to one-third less than other fire-resistant fluids—and its performance is comparable in every respect. This money-saving is a vital consideration not only initially, but in reducing make-up loss expense.

Iru Fluid 902 has other features, too:

1. It contains no corrosive ingredients and has shown no harmful effects on normal seals, fittings, or bearings . . . it will not promote rust.
2. No major equipment modification is necessary . . . simply clean your present fluid thoroughly from the system and replace with Iru Fluid.
3. Practical application proves it has exceptional viscosity and lubricating qualities . . . doesn't thin out in use.
4. The yellow color of Iru Fluid enables you to spot and trace leaks easily . . . a valuable benefit in preventive maintenance.

If you operate die-casting machines, plastic molding machines, glass blowing machines, permanent mold machines or any other hydraulic equipment where fire hazards are of concern, we suggest you investigate the advantages of Shell Iru Fluid 902.

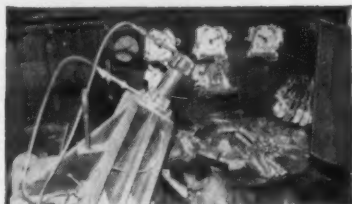
Write or call the Shell Oil Company office nearest you.

©Trademark

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California

For more data circle 392 on Reader Service Card



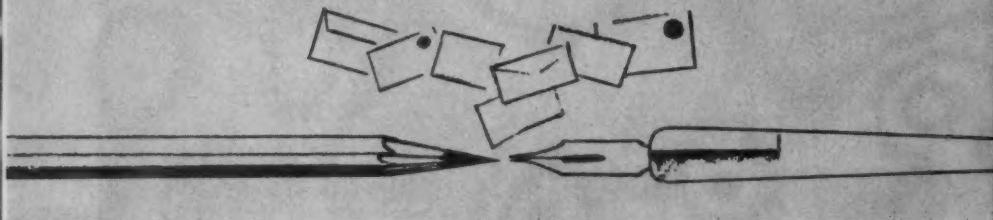
Such specialized die-casting machines require a fire-resistant hydraulic fluid to assure maximum safety.



Finger points to line break in hydraulic cable that caused flash fire and machinery damage while operating with mineral oil type fluid.



OVER THE EDITOR'S DESK . . .



TAKE THE AXE

From a recent issue of "United Effort," a publication issued at regular intervals by United Engineering and Foundry Company, Pittsburgh, we present the following:

You're a 20th Century Robinson Crusoe. The only survivor of a shipwreck. The vessel is about to break up on the reef. You can carry something ashore; not much. At hand are canned foods, a radio, an axe, clothing.

What to take? The decision will mean life or death on the desert island.

You could take the canned foods. But shortly you'd have nothing but empty tins. The portable radio—for the sound of human voices in your loneliness? But you can't build a shelter with run-down batteries. Clothing? It would soon rot away.

You take the axe.

Now you have a tool. With the axe you can build shelter . . . defend yourself . . . kill animals for food . . . chop firewood. The axe multiplies your strength and skills.

Man, by himself, is a pretty puny fellow. But give him an axe and he's a world-beater. Better yet, give him an assembly line, machine tools,

horsepower — and he'll provide the luxuries of each or if need be, the sinews for defense.

There's a problem, though. No one gives away assembly lines or machine tools. And it takes more than \$12,000 investment in tools and materials for the average job.

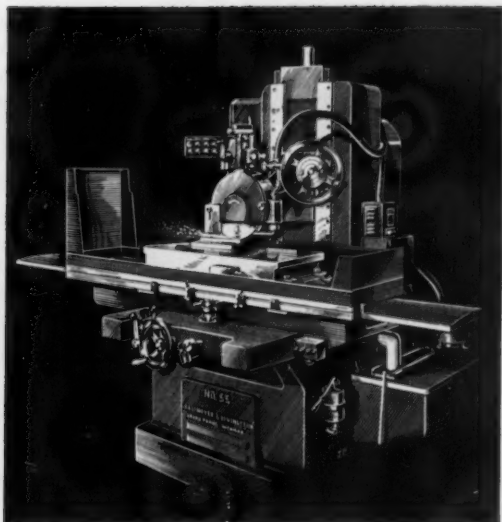
Where do these tools come from? From ordinary private citizens who plunked their savings into shares of company ownership—in the hope of earning a profit.

We in America have chosen to take the axe, the tool—on a vastly magnified scale. This choice — of tools to produce more—has helped us to live better. Better than any people, anywhere, at any time in history.

★ ★ ★

ENCOURAGE

According to a recent news release received from the University of Wisconsin, the nearly 2,400 students in the 1957 graduating class were afforded the widest choice in the history of the school from which to choose employment and careers. It was revealed that 2,132 personnel representatives from 1,446 busi-



Questions you should ask before you buy a **SURFACE GRINDER**

- Are column and base *one piece* for permanent vibrationless rigidity?
- Are both longitudinal table travel and cross feed hydraulically actuated?
- Is wheel head powered for rapid vertical travel?
- Is it equipped with Vickers vane hydraulic pump?
- Is longitudinal table capable of speeds to 125 fpm?
- Is it equipped with greased-for-life, pre-loaded ball bearing spindle?
- Does wheel head have 18 inch vertical movement?
- Is the spindle capable of speeds of 1925 and 2500 rpm?
- Does it have a 12" x 36" table working surface?
- Is it equipped with Bijur one-shot lubricating system?

You'll Choose Grand Rapids Grinder, No. 55 because it's the only grinder of its type that answers an emphatic "yes" to every one of these ten important questions.

Write for 24 page book
that tells all about it.



GALLMEYER & LIVINGSTON COMPANY

408 Straight Ave., S.W., Grand Rapids, Michigan



OVER THE EDITOR'S DESK . . .



ness and industrial firms, government agencies, and schools throughout the state and nation held 17,241 job interviews with graduating University of Wisconsin students during the past school year. It was estimated that the graduates spent some 9,000 man-hours being interviewed for jobs.

Such an interest in college graduates, you can be sure, has been evident in practically all other institutions of higher learning during recent months. The opportunity for employment afforded college graduates is increasing year by year, which leads us to suggest that we should do all that we can to encourage youngsters, particularly those of high school age, to continue their studies in college or university. No greater service can be rendered to the industrial community.

★ ★ ★

N-D TESTING

At the Ford Motor Company Research and Engineering Center in Dearborn, Michigan, radio-active materials are helping engineers conduct wear tests faster and more accurately than ever before. Of course, the very important advantage of radiation testing is that it is non-destructive.

In a typical wear test, a standard piston ring is radioactivated and inserted in an engine for a test run.

Later, the motor oil is drained and passed through radiation-detecting equipment which measures the amount of metal worn off the ring. This method accurately measures up to one-twentieth of a millionth of a pound. Once, engineers could only guess if engine piston rings rotated in actual performance. Radiation detection again provided the answer — they do and they wear evenly on cylinder walls.

★ ★ ★

FACTS AND FIGURES

While it does no one very much good to dwell too long on past experience, and we promise that we don't intend to do that here, we do think it worth noting that our optimism of last January measures up somewhat to the figures for metalworking shipments for the first quarter which were compiled and just recently released by the Business and Defense Services Administration of the U. S. Department of Commerce.

Metalworking machine shipments for the first quarter of 1957 approximated \$355 million compared with \$248 million for the same period of 1956. The estimated shipments for this quarter include \$230 million of cutting type machines and \$125 million of forming and shaping types as compared with \$183 million and \$65 million respectively, for the first quarter of 1956. Lathes, grinding machines, milling machines, and boring machines were the principal type of cutting machines shipped during the first quarter of 1957, while hydraulic,



...ANOTHER NEW
POWERAMIC
GRINDER 56B

WESSON'S Tru-Arc Grinding Principle takes the skill and high cost out of precision tool grinding.

Ask for this
**WESSON
BULLETIN...**

.... and learn how to get

- (a) far lower diamond wheel cost
- (b) faster, effortless carbide grinding
- (c) hone-like finishes

AUTOMATICALLY without need for skilled operators.
Ask for Bulletin PG157.

Wesson tools
Wessonmetal

WESSON COMPANY DEPT. AD
1220 Woodward Heights Blvd., Detroit 20, Mich.
IN CANADA:
WESSON CUTTING TOOLS, LTD.
93 JUDGE ROAD, TORONTO 18, ONTARIO

For more data circle 393 on Reader Service Card



pneumatic and mechanical type presses accounted for the major portion of forming and shaping machine shipments.

The tapering off of new orders has not seemed to have appreciably affected shipments thus far but is reflected primarily in dwindling backlogs whose cushioning effect cannot be minimized.

★ ★ ★

REVISED CODE

The Grinding Wheel Institute, 2130 Keith Building, Cleveland 15, Ohio, has notified us as to the availability of B7.1-1956, the revised American Standard Safety Code for The Use, Care and Protection of Abrasive Wheels. This newly revised Code contains many innovations which make it more usable and understandable to the users of abrasive wheels.

Send the request for your copy of the revised Code on your company letterhead.

★ ★ ★

YOUR JOB

When the going gets a bit rough, we would like to suggest that you turn to the following bit of verse that was sent to us by Standard Equipment & Supply Corporation of Hammond, Indiana:

Wherever you're working, in office
or shop,
No matter how far you are from the
top,
And though you may think you're
just treading the mill,
Don't belittle the job that you may
fill;
For however little your job may
appear,
You're just as important as some
little gear
That meshes with others in some
big machine,
And helps keep it going, though
never is seen.
They could do without you, you'll
have to admit,
For business keeps going when the
big fellow quits!
And always remember this my
friend, if you can,
The job's more important, oh yes!
than the man!
So, if its your hope, to stay off the
shelf,
Think more of your job than you
do of yourself.
Your job is important, don't think
it is not—
So try hard to give it the best that
you've got,
But don't ever think you're of little
account,
Remember you're part of the total
amount.
If they didn't need you, you
wouldn't be there;
So always my friend, keep your
chin in the air.
A digger of ditches, mechanic or
clerk;
Think well of your company, your-
self and your work.

—Anonymous



Another
advancement
in perforator
grinding...

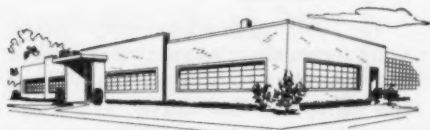
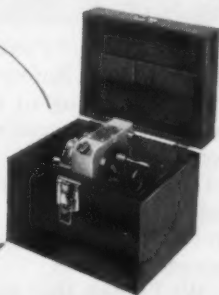
the NEW HARIG Grind-All FIXTURE

Easily grinds irregular shaped perforators concentric with shank within $\pm .0002$ accuracy. Also can be used for light milling and boring fixture, inspection tool, etc.



- 1 Single locking screw—fast action v-block adjustment holds it in desired position.
- 2 Handy crank speeds rotation of index plate.
- 3 Hardened and ground construction—a life-time of service and precision accuracy.

For your convenience . . . Handy Leatherette carrying or storage case supplied with Grind-All Fixture.



"Made by the house that Precision Built"

Don't wait! Send now for more information about Harig's new Grind-All Fixture.



For more data circle 394 on Reader Service Card

August, 1957

modern machine shop 97

OVER THE EDITOR'S DESK . . .

**Letters to the Editor:****Exchange Program**

The Office of Private Cooperation, which has worked closely with the Public Service Committee, National Industrial Advertising Association, in production of the project folders the NIAA has distributed to its members, is very pleased to see that you have published an article on the company exchange program in the April issue of *Modern Machine Shop*.

George J. Hummel, Planning Officer
Office of Private Cooperation
United States Information Agency
Washington, D. C.

Safety

The article, "Power Press Mechanization with Safety," by J. Robert Stone appearing in the April, 1957 issue of your magazine was recently pointed out to me. Mr. Stone has adroitly described a method of Safety Department function which we have tried to follow for many years.

We believe that certain beneficial values would be achieved if we were able to obtain approximately 50 copies of the article for distribution among our supervisory force. Your consideration and fulfillment of this request will be appreciated.

Gerald G. Walters, Supervisor of Safety
General Steel Castings Corporation
Granite City, Illinois

Machining Stainless

On pages 116 to 123 of your June, 1957 issue there is an excellent article entitled, "Machining Stainless Steel at Ryan Aeronautical." I would appreciate receiving two reprints of this article if it is possible.

B. F. Moore, Manager
Experimental Manufacturing
Curtiss-Wright Corporation
Turbomotor Division
Princeton, New Jersey

Automation

We read your publication and have a high regard for same. We would appreciate three reprints of "Automation Demands Perfect Communication," by Alfred M. Cooper, as published in your May issue.

Marshall G. Jancik
The Tumpane Company, Inc.
O'Hare International Airport
Park Ridge, Illinois

Quality Control

Please send me a reprint of the article "Quality Control Isn't All Statistics," written by C. W. Kennedy. This article appeared in the November, 1953 issue of *Modern Machine Shop*.

C. R. Grace, Quality Control Manager
Redmond Company, Inc.
Owosso, Michigan

New Problem

We will appreciate very much your forwarding to us two copies of the article, "New Problem Facing the Industrial Executive" which appears in the June, 1957 issue of *Modern Machine Shop*.

John Kiefer, Plant Manager
Reynolds Metals Company
Arkadelphia, Arkansas



COLLAPSIBLE TAPS

**Lop off expense of
inventory because:**

- Only one tap with five extra bodies gives a range of $1\frac{5}{16}$ " to $3\frac{1}{2}$ "
 - All shanks are interchangeable
 - They can be used either as stationary or rotary types
- Changeover time—less than 10 minutes



For full information on J&L Thread Tool Products . . .

Automatic Opening Die Heads
& Chasers

Automatic Opening Collapsible
Taps

Solid Adjustable Taps

Automatic Opening Stud Setters

Modern-Magic Chucks & Collets

A Complete Line of Accessories

...send for this free book



JONES & LAMSON

JONES & LAMSON MACHINE COMPANY, 521 Clinton St., Springfield, Vt., U.S.A.



*Class III Guaranteed
Not Sometimes, but Everytime!*

THREAD TOOL DIV.

For more data circle 395 on Reader Service Card

August, 1957

modern machine shop 99



Steel Rule Dies

Can you direct us to any organization which would be in a position to furnish us with information relative to the steel rule method of making blanking dies?

Richard T. Hess
Hess Manufacturing Company
Quincy, Pennsylvania

● *One of our best sources of information would be Chicago Steel Rule Die and Fabricators Company, 6330 W. Wrightwood Ave., Chicago, Illinois.—Ed.*

Floturn

Kindly send me one set of tear-sheets of the article "Floturn Process is Newest Method for Metal Forming" which appeared on pages 136 through 139 of the April, 1954 issue.

Victor Seymour
Loewy-Hydropress
111 Fifth Avenue
New York 3, New York

How To

Please forward to the attention of the writer one copy of the article entitled, "How to Develop Cooperative Teamwork," which appeared in the April issue of your magazine.

Raymond D'Amico,
Administrative Assistant
Fairchild Guided Missiles Div.
Wyandanch, L. I., New York

I noticed in a recent issue that there has been a heavy demand for the article "How to Develop Co-

operative Teamwork." If possible, I would like to receive twelve copies of this article. Thank you in advance for whatever courtesy you may be able to extend to this particular request.

Ernest Stukas
Carr Fastener Company
Cambridge 42, Mass.

I would appreciate very much receiving two copies of the article entitled "How to Develop Cooperative Teamwork," which appeared on pages 112 through 124 of the April issue.

R. E. Grush
Aerajet-General Corporation
P. O. Box 1947
Sacramento, California

We would be interested in obtaining, for distribution, 24 copies of the article, "How to Develop Cooperative Teamwork," which was published in the April, 1957 issue of your magazine. Thank you for your cooperation.

Joseph Canesi
Framingham Welding & Engr. Corp.
120 Leland Street
Framingham, Mass.

Please send the writer four copies of the article, "How to Develop Teamwork."

A. Snelson, Supervisor
Barrett Division
2800 S. Sacramento Ave.
Chicago 23, Illinois

I would appreciate greatly your sending me two copies of the article, "How to Develop Cooperative Teamwork" which appeared in the April issue of your magazine.

Warren D. Getchell
McCrosky Tool Corporation
Meadville, Pa.



Choose Your Wrenches as you do your friends--for life

Specify ARMSTRONG Wrenches for lifetime service, for finely balanced tools that feel right in the hand and make work easier, faster and less fatiguing. ARMSTRONG Wrenches generally are longer for size—give greater leverage. Accurately milled or broached openings give the proper clearance. They are safe wrenches because they are strong beyond need.

Drop forged and machined from high tensile carbon or special alloy tool steels, ARMSTRONG Wrenches are heat treated, tempered and tested to an exact balance of toughness, hardness and tensile strength. Each is beautiful in finish and line, is a quality tool to be proudly possessed by any mechanic—or certain to "give a lift" to any assembly line. Buy wrenches which carry the trade marks HI-TEN or ARMALLOY. On carbon or alloy steel wrenches these trade marks are your guarantee of lifetime quality.

WRITE FOR CATALOG

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
5228 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

For more data circle 396 on Reader Service Card

August, 1957

modern machine shop 101

SAFETY



ON AND OFF THE JOB

A worker killed or injured off the job is just as much a loss to his company as though he had become a casualty on the job.

By ALFRED M. COOPER
Contributing Editor

For half a century, industrial supervisors and executives, safety engineers and works training divisions have labored diligently to reduce the frequency and severity rates of injuries to the workers *on the job*. Ever since the term "safety first" was coined, accident prevention has been of major importance in industry — and we have been highly successful, even though all of us have known that safety never has actually rated "first" among the responsibilities of any supervisor. Quantity and quality of production must always rank No. 1 in that category.

Safety probably ranks second or third in importance in the average plant—except in time of war. During World War II this became quite

evident; in all-out missile nuclear warfare, safety for all Americans will, of course, be merely a by-word. But considering conditions as they exist today, it is becoming increasingly evident that much of the splendid work of the supervisor, the industrial safety engineer, and the safety training staff within the factory is being nullified by what goes on outside the factory.

Here is the situation as I see it. Everybody within the industrial plant is doing his best to reduce rates of injuries to workers. Even the worker himself has become safety-conscious — and this, of course, is the first essential of any successful safety training program. The worker of today who is not safety-minded can become very unpopular

with those individuals who work alongside of him.

So we industrial safety folk have a right to take credit for a hard job well done, while at the same time we strive to improve our record. The frequency and severity rates in industry prove this, and I believe the major share of this credit must go to the supervisor who has learned how to get out adequate production without killing or maiming his subordinates.

But any industrialist who gives only passing notice to what is going on *outside* his plant, who reads the front page of any daily paper but superficially, must be impressed by the toll of killed and maimed workers *off the job*. *In reading of these casualties we deplore the rising injury rates, in the home and on the highways, but how often does it occur to us that these very men and women who die or are maimed off the job are the very people we have*

spent millions in training to avoid accidents on the job?

In other words, if a foreman has trained his subordinates to be safety-conscious eight hours a day, what has he accomplished if these same workers are killed or seriously injured going to or coming from work, or even by breaking a leg or a neck simply puttering about their homes or during a strenuous week-end of recreation.

Obviously, it is not enough to train workers to be careful for eight hours a day. They must become safety-conscious 24 hours a day. And a most cursory glance at national accident statistics should prove that we have not accomplished this—indeed, the overall accident situation becomes worse each day, even as it improves within our factories.

The industrial supervisor can only promote safety during working hours. Other safety experts have the responsibility for prevention of accidents during the remaining 16 hours, and *they are not doing a very good job at it*. Quite possibly it will never be feasible to control off-the-job accidents.

Sometimes, of course, the safety expert is hard put to it to place the blame for accidents occurring to workers off the job. Sometimes, too, these injuries are of a nature that is almost comical. For example, a middle-aged lady I know, who is news editor on a small daily, attended a fairly sedate party given by the publisher of her paper. Nobody present was exactly intoxicated, *but along about midnight this sweet lady decided to demonstrate to the celebrants a few new dance*



"In reading of casualties we deplore the rising injury rates at home and on highways."

"A worker injured off the job is just as serious a handicap to management as one hurt in a factory."

steps. She was going great until she slipped and fell and badly sprained her ankle.

Shortly afterward she was back on the job only slightly discommoded by a pair of crutches. But *that night* she got mixed up trying to get out of her bathtub and fell again. This time she *broke the other ankle*, and now she can't even perambulate on crutches. What writing she now does is done in bed, with one leg hoisted up in traction. This situation is not at all funny to her nor to her publisher, but it is difficult not to laugh at her predicament. Yet if she had been injured *on the job*, everyone would feel deeply sympathetic for her plight and wonder why that publisher didn't take better care of his employees.

Today it is common knowledge that the safest place for any industrial employee is in the plant where he works. If he is going to be killed or maimed it will probably be on the highway, either going to or coming from work, or on a Sunday outing with his family. *After that, the greatest likelihood of his being injured is falling off a ladder or down the cellar steps at home.*

Of course there is nothing funny about this situation. A worker injured off the job is just as serious a handicap to management as one who is hurt in a factory.

The figures run something like this: In 1956, accidents of all sorts cost us ten billion dollars. Less than half of these accidents occurred on

the job. The remainder occurred either on the highway, during off-hour recreation, or at home. And as everyone knows, a highway accident nowadays, more often than not, results in a fatality. The actual split in 1956 was about 3½ billion dollars for plant accidents, and nearly 7½ billions in accidents on the highways, in recreation, and at home. (It must be remembered that many highway accidents involve trucks and company-owned vehicles, and therefore must be classified as industrial injuries.)

In 1956, 45,000 life insurance death claims were paid for highway accidents, in the amount of 97 million dollars. This was an increase of 3,000 death claims paid over 1955. Such a yearly increase *within* industrial plants would deep-



"... along about midnight this sweet lady decided to demonstrate a few dance steps."

ly shock management. Yet most of those who died were industrial employees, so the effect was the same as though they had died on the job. And in a period of acute labor shortage this death toll, to say nothing of the millions injured on the highways, is just as serious as a corresponding increase in accidents within the plant.

Theoretically, the industrial supervisor has no responsibility for highway traffic accidents in which one or more of his subordinates are killed or injured, and no control over injuries this worker suffers at home or during week-end recreation activity. But in practice, that supervisor's work-force is just as badly crippled by such an off-the-job accident as though it had occurred in the factory. And this crippling is more keenly felt today, due principally to labor shortages and the appalling rate of increase in off-the-job type of accidents.



"... the greatest likelihood of being injured is falling down the cellar steps at home."

Accidents in the home occur with almost unbelievable frequency, not only to the man of the house, but to his wife (who may also be employed) and to his children. Considerable publicity has been given to this fact by national safety organizations and by insurance companies. But there is no evidence that this publicity is having any effect whatever in reducing such accidents. Quite the opposite.

Highway accidents are the direct concern of many organizations, including the highway patrol departments of every one of our states, and our city traffic police departments. Since 1930, I have met frequently with representatives of these bodies, conducting conferences in which the intent was to work out methods by which highway accidents could be reduced. I found these intelligent officers deeply disturbed by the ghastly increase of slaughter on our highways, and I also found that each official offered a different solution to this particular problem, based primarily on his own experience in his own community or commonwealth.

In only one situation have I found it possible to bring about a sharp reduction in highway accidents by means of a formal series of discussions on safety. This has occurred when the group members were truckdrivers (usually cross-country transport truckers) who were directly employed by the company that employed me to put on this safety training.

In such case it has been possible to use the same methods which have proved successful in training other industrial employees in acci-

"... most experts agree that the long-haul truck driver is probably the safest driver on our highways."

dent prevention, and which I have outlined in these pages at various times. In general, I believe most experts on highway accident control now agree that the long-haul truck-driver is probably the safest driver on our highways. *Even the casual observer cannot help but be impressed by the fact that, when a big truck-and-trailer is involved in a serious accident, the truck was run into by some careless driver of a light passenger car.* Which, considering the relative weights of the two vehicles, shows very poor judgment on the part of the passenger car driver, to say the least.

Drivers of fleets of trucks owned by a corporation can be given safety training that gets results. They can also be trained in highway courtesies. But this type of train-

ing cannot possibly be given to the average passenger car operator. Aside from instruction in safe driving in some of our schools (which does not always get the long-time results we hope for), about the only things our highway safety authorities can employ are adjurations, admonitions, catchy slogans, the establishment and enforcement of speed limits, and the punishment of offenders after an accident has occurred — in the unlikely event the offender is still alive.

Anyone who has ever made a casual study of training in accident prevention knows full well that the foregoing measures never have and probably never can materially reduce accident rates on our country's highways.

For example, most of us can remember when we were assured, only a few years ago, that the "Three E's" of highway safety would shortly reduce accident rates all over America. These were, of course, "Engineering," "Enforcement," and "Education." Since then we have seen the highway death toll steadily mount, despite the development of the Three E's to a high degree.

Consider Engineering, for example. We had a lot of smashups on the old two-lane slab highways and our engineers came up, as a first improvement, with the three-lane highway. But within a year or so, these three-lane thoroughfares were flatly labeled by highway patrolmen as "death-traps." The reason, of



"... the truck was run into by some careless driver of a light passenger car."

course, was that the *third lane* was designed to be used for passing by motorists traveling in either direction. And, too often, it was so used, *simultaneously*, by drivers bound in *opposite directions*. Result—an increase in terrible smash-ups directly attributable to this “engineering improvement.”

Thereafter the three-lane idea was abandoned, and the four-lane highway became the thing. At first the four lanes were merely marked out on one broad strip of pavement; then they were separated a bit by parking strips; thereafter they were often separated by distances of as much as a hundred yards. And as traffic increases warranted, cloverleaves and other intriguing devices were installed to obviate cross-roads, and the four-lane highway often developed into a six-lane or eight-lane separated affair, and the names “Speedways” and “Turnpikes” were proudly applied to these magnificent engineering developments.

It appeared that “Engineering” had at last licked the highway accident problem. With east-and-west traffic separated by a parkway, and with several lanes available for cars all traveling in the same direction, how could accidents occur?

Nobody who does much driving can possibly quarrel with the beautiful new Speedways now extending more or less from coast to coast. They certainly are great time-savers, and very restful to the driver's nerves. You can readily cruise along, hour after hour, at 70 miles per hour and, even at that speed, it is well to hug the right-hand lane so that the 80-to-90 mile per hour autoists can easily pass you at will.

But, amazingly, people continued to get killed, and at increasing rates, even on the super-duper Speedways. Now we began to hear more of the “hypnosis” of driving, and the tedium of covering great distances when all hazards had been removed. We found (as the factories learned decades earlier) that mechanical safeguards and superb design are helpful, but that so long as humans operate cars, they could find some way to tangle up with other drivers, even on Speedways.

So, today (as any State patrolman will tell you), when we *do* have a highway smash-up, it is seldom a simple two-car collision, but there will be at least three cars involved, and more likely five, six, or a dozen, and perhaps a couple of great transport trucks thrown in for good measure. And at the speeds these cars travel on the Freeway, survivors rarely live long enough to get more than a DOA (dead on arrival) rating at the nearest hospital.



“... that third lane was used simultaneously by drivers bound in opposite directions.”

"The truth is, that speed limits everywhere are approximate and also relative."

The whole catastrophe probably was due to a split-second of negligence or recklessness on the part of but *one* of the drivers involved.

Appreciating at last that Engineering could not reduce the number of highway accidents, the second of the Three E's was put to work. Speed limits were established all the way from 10 miles an hour in school zones to 15 and 25 miles in residential districts, up to 40, 55, or 60 miles out of town.

Of course, it is impossible for any force of highway patrolmen or local police to catch everyone who exceeds a posted speed limit. Indeed, in most areas the police do not stop cars if they are within five miles of the legal speed limit — except in recognized speed-trap localities.

The truth is, that speed limits everywhere are approximate and also relative. This is proved by the fact that most State motor vehicle departments rule that the driver must be traveling at a *safe rate of speed*, no matter what the posted speed limit happens to be.

Nobody can quarrel with this decision. The difficulty for the stranger is in determining what is a safe rate of speed in—let us say—a zone specifically marked as a 35-mile area. Most tourist drivers watch speed-limit signs carefully and do not exceed these within towns or cities by more than five miles per hour. (Following this particular principle, I have never been flagged down by a traffic policeman in any state in the Union.

iceman in any state in the Union.

The trouble comes when situations develop in which a speed of 35 miles an hour is deadly hazardous in a posted 35-mile zone. If the driver is relying on the posted speed limit as a guide, he may well attempt to maintain this speed throughout that zone in order not to hold up traffic. He may assume the authorities who put up those signs knew exactly what the hazards were in that area.

Again, most states post either 55 or 60 miles as the top legal speed for any Speedway, yet everyone who uses these thoroughfares regularly knows that the *average* speed here may well be in excess of 70 miles. *And unless the vehicle that is traveling at this speed is obviously a dilapidated old heap, or unless*



"... people continue to get killed, at increasing rates, on the super-duper Speedways."

the driver gives evidence of being intoxicated or emotionally unbalanced, no citations are issued by traffic officers at such speeds.

And wisely so. Such speeds, on Freeways not overcrowded and in the case of good cars and drivers, are not hazardous; nor can speed *per se* be rated as the leading cause of accidents. We found this out years ago in analyzing industrial injuries. Speed is demanded of most workers; it is only when some other element enters into the picture that an accident occurs. Thus, it would be better to say that certain highway accidents are caused by *undue* speed, or *haste*, while more of these are caused by reckless driving at any speed.

Undue speed may result when a car is traveling at 35 miles an hour in the wrong place and at the wrong time. It is also true that two cars colliding head-on at 40 miles an hour can create as much havoc

as when the speed of each is 70 miles per hour. Those two transport airliners that met head-on over Grand Canyon were each exceeding 300 miles per hour, yet no one would be so stupid as to blame such an accident onto speed.

Obviously, we are going to find it necessary in the future to accept speed as inevitable, on our highways as well as in the factories and in the air. We are a speed-minded people. Automotive engineers assure us that within five years new cars will be equipped with engines of twice the present horsepower, and these autos will even dispense with all gearshifting, even at starting from a standstill.

If this be true, then we may surely look forward to yet greater cruising speeds on our super-highways. Also, most good drivers are aware that speed often permits them to avert accidents that would otherwise be inevitable, while sedate dawdlers traveling at 35 m.p.h. may even today be given tickets for obstructing traffic.

Law enforcement that depends primarily on speed control for its efficiency is not going to reduce highway fatalities. A few years ago I led a safety discussion attended by most of the bigwigs of the State of California, whose job it is to lower highway accident rates. Speed on open highways came in for little consideration, but the deputy chief of police in charge of traffic for the City of Los Angeles was emphatic in placing "selfishness" as the prime cause of highway accidents, and the other experts present agreed with him.

This expert's contention was sim-



"... the vehicle that is traveling at this speed is obviously a dilapidated old heap."

"Industrial employees can be carefully trained in accident prevention until the safest place to be is on the job."

ply that drivers who demand more than their share of the road, or who impatiently attempt to pass the car ahead at the wrong time, or who persist in other selfish practices, are the ones who cause most of the highway accidents.

I think this official was right. And, frankly, I know of no way in which we can legislate selfishness out of any driver, or enforce unselfishness by law, even though we patrolled our highways with a million traffic cops. Once in a while a highway patrolman may happen to be in the right spot at the right moment to give a ticket to a selfish, thoughtless driver. But we all know that we witness scores of instances of hazardous driving on any thousand-mile trip that we wish some traffic cop had seen. Almost invari-

ably, however, when the inevitable smash-up occurs, the highway patrolmen are notified of the tragedy by radio and reach the scene of the carnage minutes later — when they can only give succor to any survivors who show signs of life, and thereafter attempt to determine what caused the accident. In far too many instances the simplest cause to report is "excessive speed," and that is one reason why we are continuously warned against driving too fast.

If the officer reported the cause of most accidents as "selfishness," as did the 30-year deputy chief in charge of traffic, he might be criticized. For, in some degree at least, rates of speed can be enforced, but how on earth can unselfishness be enforced?

So, as with the first of the Three E's (Engineering), the second, Enforcement, must fail, as it always has, to prevent highway accidents.

As to the third, Education, the situation in regard to accident prevention is fairly simple in industry, and most difficult of application on our highways. *Industrial employees can be carefully trained in accident prevention until it has become a by-word with both management and workers that "the safest place to be is on the job."* And these employees are under constant supervision of a superior.

But effective safety training cannot be successfully carried out in a factory or shop by haranguing the



"... drivers who demand more than their share of the road cause the most accidents."

employees on this subject, nor by the posting of bulletins, or by attempting to frighten them with published statistics or catch-phrases. This is obvious to anyone who has been at all successful in teaching industrial safety.

However, those who have the responsibility for preventing highway accidents can do little more than these very ineffective things. True, those truckdrivers who maintain spotless accident records know that *safe driving* is their *job*, and they can be given effective safety training. Likewise, many of our public schools are doing a good job in training teenagers to drive, not only well, but safely. (Of course, the school people cannot be certain that any student so trained will continue to drive safely, but at least *he knows how to do so.*)

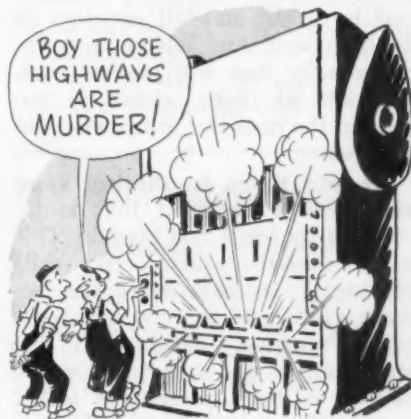
Other than this, education of our auto drivers has of necessity been a most haphazard affair. Mostly it takes the form of warnings, admonitions, the development of clever slogans, and accurate prognostications of the number of citizens who will die on our highways over any given holiday week-end.

These methods, of course, have no bearing on safety training, and would prove altogether ineffectual in any factory. Most experts on highway safety appreciate this fact, but they are stumped as to how to go about giving genuine safety training to the public at large. In instances, it has been found possible to force small groups of citizens who have been involved in highway accidents to regularly attend safety training courses conducted by the local police officers.

Beyond this, the third E appears to be impossible of proper application in a free society. In Russia, I suppose everybody could be forced to take training in safe driving, but over there cars are few, and gasoline so high in price, that there probably isn't any highway safety problem.

In industry, we have long ago ceased to say "one man must die for every mile of hard-rock tunnel completed." Now we build any number of tunnels, great dams, and the mightiest of suspension bridges without the loss of a single life. This is solely the result of improved accident prevention in industry. *However, it is too bad that the worker who has been carefully trained to avoid accidents on the job may well get killed or seriously injured, either on the highway or at home.*

Accidents on the highway are readily understandable. But how on



"... employees can be trained in accident prevention until safest place is on the job."

"Of late there is another type of off-duty accident . . . this is mishaps which occur while boating."

earth we contrive to get bunged up at home I cannot say. Nevertheless I, who have never been involved in a highway accident nor injured on the job, carry a number of scars to prove that homes can be very dangerous places. Statistics appear to point to the home as one of the most hazardous places the worker can enter. It would seem that, once he leaves his safe factory, he is in for trouble. If the highway doesn't get him, the home accident will.

I have seen no statistics regarding the lost-time injuries suffered in basement workshops since the do-it-yourself fad began, but the casualties down there must be pretty high. Even before that era we putters appeared to experience little trouble in falling off ladders, slipping on a top step, or (like the lady I mentioned earlier) being hospitalized by a slip-and-fall accident in the bathroom. And I have no panacea to offer that will prevent such accidents at home, either to the head of the house or to his wife and children.

Of late there is another type of off-duty accident that is increasing by leaps and bounds. This is the mishaps which occur while boating. Pleasure boating has become a universal pastime, and boats can be positively dangerous to life and limb. *As one who has owned a number of craft, power and sail, I am convinced that because boating is considered a "pastime," people appear to neglect the most rudimen-*

tary safety precautions when going fishing or cruising in a boat.

Thus, the most wildly chance-taking boatowner I ever knew was a transcontinental airline pilot with more than a million hours of safe flying to his credit. But when that fellow was off duty he would shove off for an extended cruise with his family of four, in any weather, and in a leaky old gasboat, the bilges of which smelled to high heaven of raw gasoline. So far as I know, this pilot never had an accident afloat, but this was pure luck. I have known many another boatowner who survived the worst sort of negligence — and have also witnessed the death of four little children who were trapped in the cabin of a flaming cruiser which had no forward escape hatch. Often this boatowner



"... worker who has been trained to avoid accidents on the job may get injured at home."



"... people neglect the most rudimentary safety precaution when fishing in a boat."

had assured me he *intended* one day to cut a hole in his forward deck and install an escape hatch, but somehow he never found the time.

So there it is: We can train our workers to observe safety precautions on the job. On the highway, at home, or on recreational trips we cannot do much for them. Nevertheless, every worker killed or injured off the job interferes with production just as surely as though he had suffered a lost-time injury or a fatality during working hours. The industrial safety man is doing a good job, and he can and will do a better job. But until some means is found to keep the worker safety-conscious 24 hours a day, a lot of industrial accident prevention is going to be nullified by what happens to the worker on the highways and during holiday recreational activities. The responsibility here must be shouldered by individuals other than the industrial safety expert.

The Machining and Grinding of Gray and Nodular (Ductile) Cast Irons. By Norman Zlatin and Charles F. Walton. Published by Gray Iron Founders' Society, Inc., 930 National City-E. 6th Building, Cleveland, Ohio. Price, \$3.00 per copy.

Intended for use in the design, engineering and production of cast components, this 57-page manual is divided into two parts. Part I, "Machining," includes chapters on the selection of tool materials, grinding cutting tools, machining applications, machining properties of iron castings, economics of machining and general machining recommendations. Part II, "Abrasive Finishing" (grinding), covers various types of finish grinding, honing and lapping operations.

Abundantly illustrated and including numerous commercial and practical examples, this manual constitutes a real down-to-earth and ready reference on machining and abrasive finishing. The manual presents recommended practice for feeds and speeds as well as tooling. Machinability data are given for the various available types of cast iron and related to microstructure.

More Information?

For additional information on any product mentioned in this issue, please use the READER SERVICE CARDS opposite pages 32 and 340.

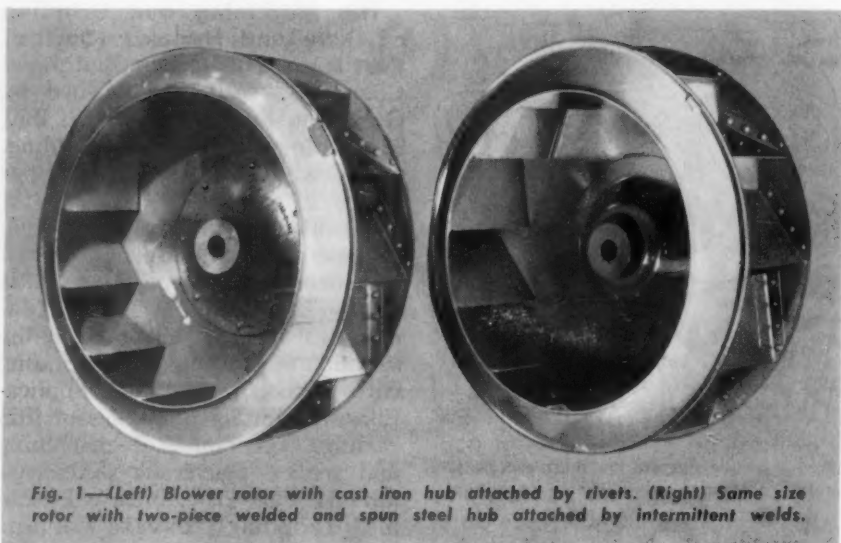


Fig. 1—(Left) Blower rotor with cast iron hub attached by rivets. (Right) Same size rotor with two-piece welded and spun steel hub attached by intermittent welds.

WELDED AND SPUN STEEL DESIGN USED IN Fabricating Rotor Hubs

Resulting assembly features reductions in cost and weight, better performance, characteristics and enhanced appearance over former design.

By HARRY A. MEYER*

Director of Design, American Blower Division,
American Radiator Corporation, Detroit, Michigan

Through a unique combination of automatic arc welding and spinning operations, effective reductions in cost and weight, better performance characteristics and enhanced appearance have been realized in the redesign of rotor hubs

*Based on an award-winning paper in a recent design competition sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

for small industrial fans or blowers. Originally of cast iron, with flange riveted to the rotor assembly, the new two-piece hubs are of S.A.E. 1020 and 1015 steel, welded to the rotor. Further advantages of the redesign include a more uniform section, shorter production schedule, safety from blow-up at excessive speed and elimination of breakage

in the handling and assembly of workpieces.

Function of the hub is, of course, to connect the blower rotor to driven shafts or direct to electric motor shafts. It is used in combinations with different diameter fan rotors varying, therefore, in size and bore according to horsepower and speed requirements. The old and new versions of the hub are shown assembled to rotors in Fig. 1.

In approaching the goals outlined above, several alternatives were considered. Cast steel was eliminated from consideration, principally because of cost and delivery angles. Welding of the barrel of the hub di-

rectly to the fan rotor was ruled out because of the danger of fatigue failures and also because of the difficulty of correcting rotor runout. A die-formed hub and flange was discarded due to the excessive tooling cost for the quantities (about 2,500 annually) required.

The final solution was to make the part in two pieces and weld them together, followed by spinning to final form. A flat disc of S.A.E. 1015 steel is circle sheared on the outside diameter and a center hole punched. The hub barrel is of S.A.E. 1020 steel, bored, turned, cut off, keyseated and drilled. It has two outside diameters, the smaller mat-

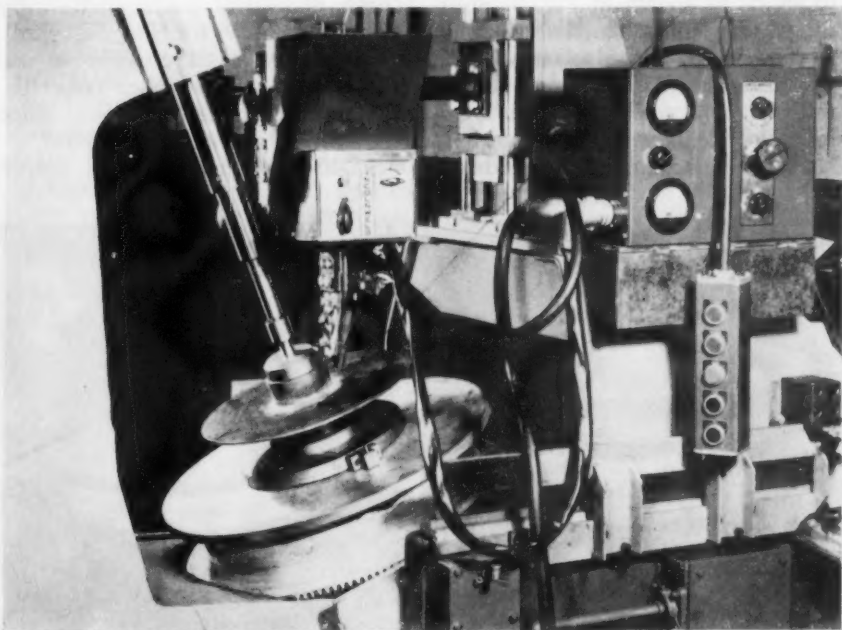


Fig. 2—Sheared and punched disc is assembled to turned hub barrel and welded automatically on both sides in the submerged arc welding setup, shown herewith.

"... cost savings averaged out 61 per cent, accrued in part from reduction in machining time on the new design ..."

ching that of the hole punched in the disc. This design permits fitting the disc up against the shoulder on the hub before welding.

The assembly is positioned as shown in Fig. 2 under an automatic submerged arc welding head, the part being power rotated under the head as the weld bead is deposited. A full fillet weld is made on both sides. Welding current is furnished by a 600-ampere motor-generator.

Next the weldment is clamped to a form or die and the disc is spun to shape as shown in Fig. 3. Spinning "irons out" distortion resulting from welding and also centers the mounting flange accurately with the finished bore since the piece is piloted in the bore during spinning. An earlier attempt was made to

weld the hub center to a die-formed disc, but it proved unsuccessful because of excessive runout.

The two hub designs—cast and welded—are shown side by side in Fig. 4. The most striking feature is a 42 per cent average saving in weight for the steel type.

Of equal importance are cost savings, which averaged out at 61 per cent. These savings accrued in part from reduction in machining time on the new design, with operations being handled on a 6-inch bar machine, instead of the 25-inch swing lathe necessary for the cast hub. Furthermore, it is possible to use the centers blanked from larger rotor rims to make hub discs, since they are of the same type steel.

Lighter weight permits lighter



Fig. 3—(Left) Welded assembly is clamped tightly over form die mounted on rotating table. Spinning tool is ready for start.

(Right) Completion of spinning operation which shapes the disc accurately and "irons out" distortion resulting from welding.

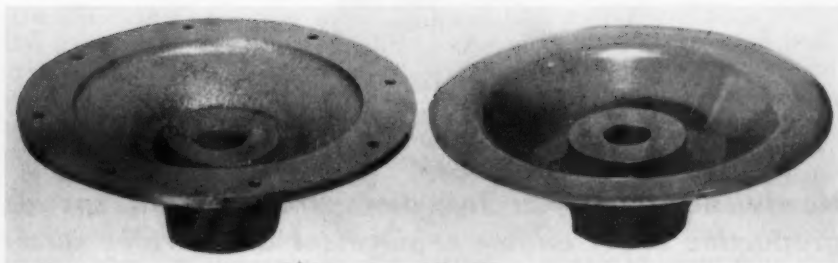


Fig. 4—(Left) Cast iron hub and disc has average weight of 71 lbs., comparatively rough surface appearance and top operating

speed of 980 r.p.m. (Right) Redesign in steel weighs 41 lbs., has a smooth surface and maximum speed of 1,860 r.p.m.

bearings and shafts, adding to cost savings. Dynamic balancing of the steel design is easier and requires fewer and smaller balance weights on the finished rotor, as Fig. 1 clearly indicates.

Maximum operating speed of the steel hub is higher than for cast iron, since surface speed of the cast hub must be limited to 5,000 f.p.m. Thus, on one size, top speed of cast iron is 980 r.p.m., against 1,860 r.p.m. for steel. In addition, exceeding the maximum speed of a cast hub may lead to failure by fracturing or "blowing up," while in the case of the welded and spun steel hub such failure is nothing more than distortion of shape. Smoother surface of the latter design also means reduced operating noise, as well as greatly improved appearance.

Assembly of the hub to the blower rotor formerly was effected by means of eight rivets, with holes being drilled in the outer edge of the hub disc as illustrated. Occasional field reports of rivet heads "popping off" led to the decision to attach the redesigned hub by manual weld-

ing, using intermittent or skip welds as indicated in Fig. 1 on the first page of this article.

★ ★ ★

Manufacturing Processes. 4th Edition. By Myron L. Begeman. Published by John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 612 pages. Cloth binding, board covers. Illustrated. Price, \$8.

Every chapter of this book has been rewritten for the fourth edition of this comprehensive treatment. Less descriptive than previous editions, the book places greater stress on principles and materials. Advantages and disadvantages of various processes are discussed.

New topics discussed include electroforming, metal coating processes, electrosark machining, ultrasonic machining, chem-milling and automation. There are 166 new illustrations, 89 of which are line diagrams. The author makes valuable use of the line diagram in his presentation—there are 225 such diagrams in all. In addition, the photographic illustrations have been revised to show modern equipment.

"... cost savings averaged out 61 per cent, accrued in part from reduction in machining time on the new design ..."

ching that of the hole punched in the disc. This design permits fitting the disc up against the shoulder on the hub before welding.

The assembly is positioned as shown in Fig. 2 under an automatic submerged arc welding head, the part being power rotated under the head as the weld bead is deposited. A full fillet weld is made on both sides. Welding current is furnished by a 600-ampere motor-generator.

Next the weldment is clamped to a form or die and the disc is spun to shape as shown in Fig. 3. Spinning "irons out" distortion resulting from welding and also centers the mounting flange accurately with the finished bore since the piece is piloted in the bore during spinning. An earlier attempt was made to

weld the hub center to a die-formed disc, but it proved unsuccessful because of excessive runout.

The two hub designs—cast and welded—are shown side by side in Fig. 4. The most striking feature is a 42 per cent average saving in weight for the steel type.

Of equal importance are cost savings, which averaged out at 61 per cent. These savings accrued in part from reduction in machining time on the new design, with operations being handled on a 6-inch bar machine, instead of the 25-inch swing lathe necessary for the cast hub. Furthermore, it is possible to use the centers blanked from larger rotor rims to make hub discs, since they are of the same type steel.

Lighter weight permits lighter



Fig. 3—(Left) Welded assembly is clamped tightly over form die mounted on rotating table. Spinning tool is ready for start.



(Right) Completion of spinning operation which shapes the disc accurately and "irons out" distortion resulting from welding.



Fig. 4—(Left) Cast iron hub and disc has average weight of 71 lbs., comparatively rough surface appearance and top operating

speed of 980 r.p.m. (Right) Redesign in steel weighs 41 lbs., has a smooth surface and maximum speed of 1,860 r.p.m.

bearings and shafts, adding to cost savings. Dynamic balancing of the steel design is easier and requires fewer and smaller balance weights on the finished rotor, as Fig. 1 clearly indicates.

Maximum operating speed of the steel hub is higher than for cast iron, since surface speed of the cast hub must be limited to 5,000 f.p.m. Thus, on one size, top speed of cast iron is 980 r.p.m., against 1,860 r.p.m. for steel. In addition, exceeding the maximum speed of a cast hub may lead to failure by fracturing or "blowing up," while in the case of the welded and spun steel hub such failure is nothing more than distortion of shape. Smoother surface of the latter design also means reduced operating noise, as well as greatly improved appearance.

Assembly of the hub to the blower rotor formerly was effected by means of eight rivets, with holes being drilled in the outer edge of the hub disc as illustrated. Occasional field reports of rivet heads "popping off" led to the decision to attach the redesigned hub by manual weld-

ing, using intermittent or skip welds as indicated in Fig. 1 on the first page of this article.

★ ★ ★

Manufacturing Processes. 4th Edition. By Myron L. Begeman. Published by John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 612 pages. Cloth binding, board covers. Illustrated. Price, \$8.

Every chapter of this book has been rewritten for the fourth edition of this comprehensive treatment. Less descriptive than previous editions, the book places greater stress on principles and materials. Advantages and disadvantages of various processes are discussed.

New topics discussed include electroforming, metal coating processes, electrosark machining, ultrasonic machining, chem-milling and automation. There are 166 new illustrations, 89 of which are line diagrams. The author makes valuable use of the line diagram in his presentation—there are 225 such diagrams in all. In addition, the photographic illustrations have been revised to show modern equipment.



Machining Jet Discs

Newly developed center drive tracer lathe speeds production of jet engine compressor and turbine discs.

By IRA S. ROBERTS

One of the big bottlenecks in the production of jet engines by the aircraft industry has been in the machining of the jet engine compressor and turbine discs. These discs vary considerably in diameter and in contour but they all have the common characteristics of a thin web section and contoured form, making them extremely difficult to machine holding the required tolerances and producing the required surface finishes. With each new engine design, the thickness of the disc has been decreased and machining problems have increased. Present design discs are approximately 0.115 inch thick and there is a demand for discs 0.080 inch thick, while in theory, a disc with a web thickness of 0.010 inch would be sufficiently strong if it could be machined.

The Gisholt "Masterline" Center Drive Tracing Lathe represents a tremendous forward step in the design of a lathe for this type of work. With a capacity for 28 inch diameter discs, it is designed for heavy duty rough machining operations on either stainless steel or titanium. It is also designed to produce to the

extreme accuracies required in the finish machining of the discs. Its main advantage, however, lies in the fact that it can set up to machine both sides of the disc simultaneously, using a four-pass Gisholt JETracer on each side, with templates governing movements of the tools for roughing and a separate template and new tool indexed into position for the finish cut. This arrangement offers complete accuracy in the reproduction of the required contours and a very fine finish through a variable speed drive controlled by movement of the tracer cross slide.

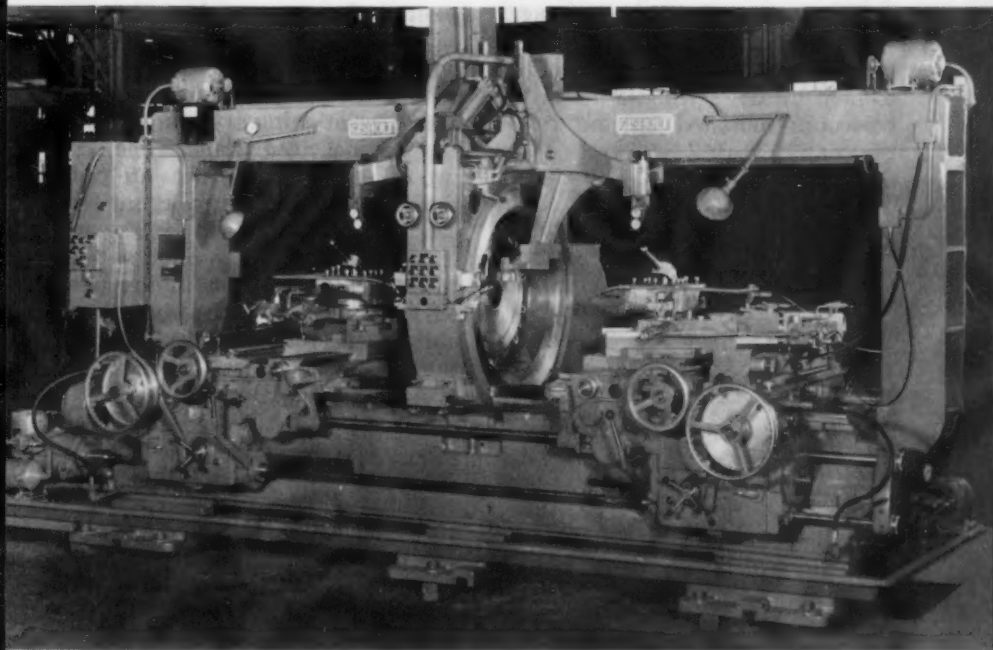
Basically, the machine consists of a bed with a center driving unit and overhead support. The center driving unit is mounted in anti-friction bearings and driven through spiral gears at the back of the unit. Pick-off gears determine the basic spindle speed. The overhead support or bridge carries two chain-driven longitudinally movable (clearance for loading and unloading) arms with support rollers. One of these arms contacting and supporting the work on a previously faced hub diameter, just above the center line is shown in the general

view illustration. A similar roller is also supporting the workpiece from the left-hand side, thus preventing any longitudinal movement or distortion of the work during the contour facing operations.

A second pair of pivoting arms, operated by hydraulic cylinders, carry "tenth" indicators used to accurately position the tools for the close tolerance facing and boring operations. Extending to the left and to the right of the center driving unit are extra wide bedways supporting a left-hand and a right-hand independent side carriage, each complete with a bridge-type cross slide with 34 inches of cross

movement, a JETracer slide and a four-position turret type tool post. Each cross slide has a four-position indexing drum to carry the necessary tracer templates, permitting a maximum of four different passes over the work. Each side carriage has a 24-inch longitudinal movement. Rapid traverse is provided for each carriage in the longitudinal direction and for each cross slide in the transverse direction. A complete pressure lubrication system is provided for all moving parts of each carriage.

The lathe is powered by a 60 h.p. variable speed motor arranged to rotate the center driving unit in



Designed to speed production of jet engines, this new Gisholt "Masterline" Center Drive Lathe simultaneously machines both sides of

28-inch diameter jet engine compressor discs using JETracer to produce difficult contours to a very high degree of accuracy.

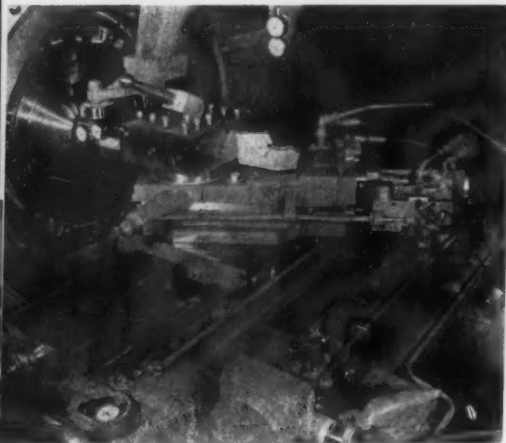
"The machine has provision for reversing direction of spindle rotation when tracer controlled tools reach mid-points on discs."

either direction and at a varying speed to provide constant surface footage for the cutting tool. This is controlled by movement of the cross slide.

The machine has provision for reversing the direction of spindle rotation when the tracer controlled tools reach mid-points on the discs. This permits machining from behind the center line and across center from the i.d. to the o.d., speeding machining operations. Other machine features include longitudinal feed dials for both carriages, tool setting gages placed on the center drive housing, adjustable lights to help in tool setting, 8-power microscopes mounted on the center

drive housing for extremely accurate tool setting, and dial indicators and stop rod arrangements to speed longitudinal and transverse positioning of the tools, cross slides and carriages for the different cuts.

A brief discussion of the actual machining operations follows: With both carriages retracted, the workpiece, which has previously been placed in a chucking ring, is loaded and clamped in the center driving unit. The carriages are advanced independently and positioned for a straight facing cut on the small hub diameter. Tools are back of the center line and the spindle is running in reverse. Accurate positioning is assured using longitudinal feed dials. Then, the two roller supporting arms are positioned, providing support at the center on the machined surface and counterbalancing each other so that there is no distortion in the part. The cam drums are positioned presenting the roughing templates to the JETracer stylus, the carriages are located longitudinally and the first roughing cut is made across the face with the tools starting at the rear of the centerline near the outside diameter of the disc. With the proper turret tool in position, the cross feeds to the cross slides are engaged and the cut proceeds across the entire face of the disc with the direction of spindle rotation changing as the tools pass from rear to front. A semi-finishing cut is taken in the same manner, and



This close-up view shows how cutting tool is accurately positioned for the boring cut. Note roller support to the disc, JETracer slide and four-position tracing template carrier.

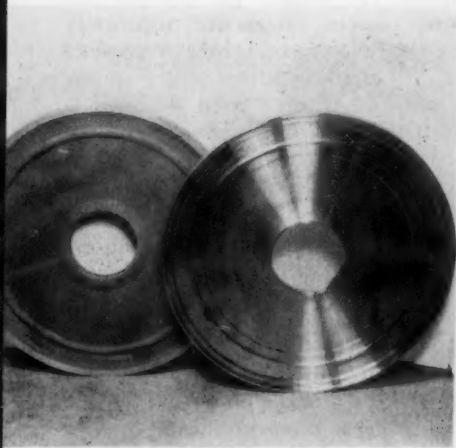
"Discs have been machined, under production conditions, down to 0.080 inch and experimentally down to 0.007 inch."

then one of the carriages is accurately positioned and the center bore is rough and finish machined. Then, the disc is removed from the machine and, after a stress relieving operation, is finish machined in the manner as described above.

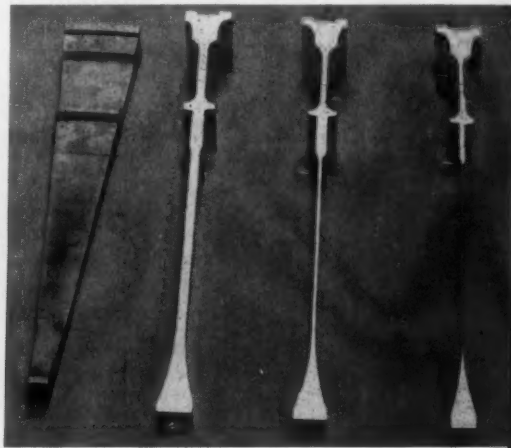
A number of Gisholt "Masterline" Center Drive Lathes are in operation at Pratt & Whitney Aircraft, East Hartford, Connecticut. Eventually there will be 29 machines in operation at this one plant. They have proven themselves by decreasing the time required to machine a jet engine compressor disc from 281 minutes to 181 minutes. In another case, 30 minutes have been cut from the time requir-

ed to machine a jet turbine disc. In addition to the time saved, the new machine operates to a finer degree of accuracy than previously attained for these parts.

Gisholt conducted experimental work with this new lathe on 28-inch diameter compressor discs and reports that it is able to hold an accuracy in the center bore and the snap ring diameters of less than 0.001 inch. Discs have been machined, under production conditions, not only to the required 0.115-inch web thickness, but also down to 0.080 inch and experimentally down to 0.007 inch. Parallelism with the bore, o.d., and the two work faces is 0.0008 inch on the 14-inch radius.



Before and after views of a 28-inch diameter jet engine compressor disc which was machined on the Gisholt "Masterline" Center Drive Lathe in a period of 181 minutes.



Sections of jet discs showing (left to right) front view of contour; edge view of 0.115-inch web; edge view of 0.080-inch web; edge view of 0.007-inch web.

PRESS-WELDER COMBINATION IDEAL FOR

Manufacturing Blower

Production involves three steps—stamping, assembling and welding, all accomplished without an operator.

By BARTLETT WEST

By closely integrating high-speed stamping and resistance welding operations, the Mayne Products Co., Dayton, Ohio, a leading air conditioning manufacturer, is able to turn out up to 150 blower wheel cages per hour. Producing the cage involves three steps; namely, stamping, assembling and welding—all accomplished without an operator. The completed subassembly

is then rolled and beaded to complete the blower wheel. The production line can be readily changed over to accommodate many different-size wheels.

As the operation begins, strip steel enters a 76-ton Precision Flexopress, Fig. 1, through its integral feed mechanism which provides precise stock advance. Operating at 120 strokes per minute, the press pierces, lances and accurately forms the blower louvers. According to the manufacturer of the press, Precision Welder and Flexopress Corporation of Cincinnati, the exclusive "no float" ball bearing raceway construction of the press ram assures unusual vertical accuracy and parallelism, affording long die life.

Completed stampings are transferred by a special mechanism, Fig. 2, which conveys the first stamping three feet and drops it into position on the lower tracks. The second stamping is then interlaced with the

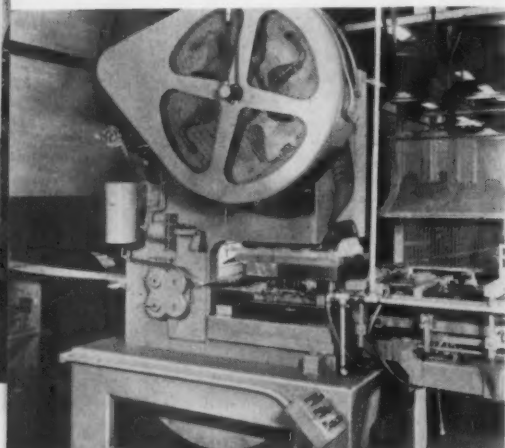


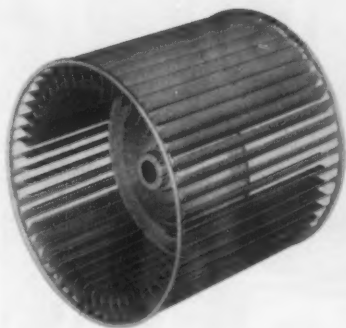
Fig. 1—Strip steel is pierced, lanced and formed on this Precision 75-ton Flexopress.

er Wheel Cages

first stamping and accurately positioned. Both stampings are then indexed to the welding station.

Two specially tooled standard Precision 30 kva. bench welders automatically index and join the two stampings with a 38 high-strength welds. Adjustable limit switches automatically start the electronic timer which sequences the weld and the index.

All equipment for the stamping, welding and indexing of the subassembly was designed and built by The Precision Welder and Flexopress Corporation, Cincinnati, Ohio, working with production and meth-



Completed Mayne blower wheel. Cages are stamped, assembled and welded at rates of 150 per hour, with no operator required.

ods engineers of the Mayne Products Company, Dayton, Ohio. The manufacturer points out that by integrating stamping and welding from the very beginning, production rates of the two machines can be accurately sequenced to obtain high production, with the press and welder both operating at peak efficiency.

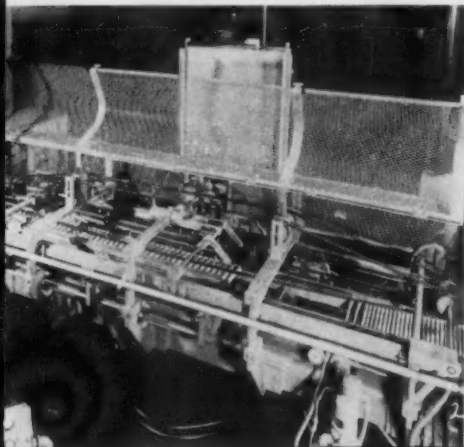


Fig. 2 — This transfer mechanism conveys, positions, and interlaces two stampings.

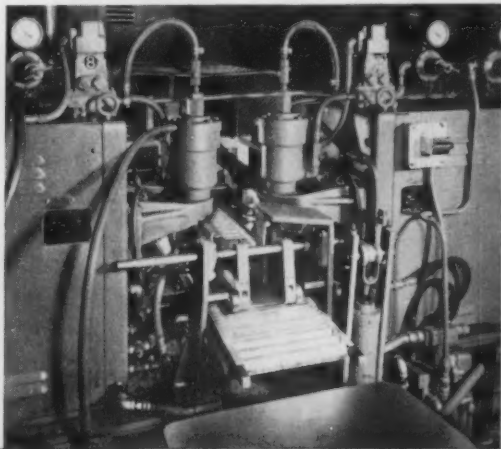
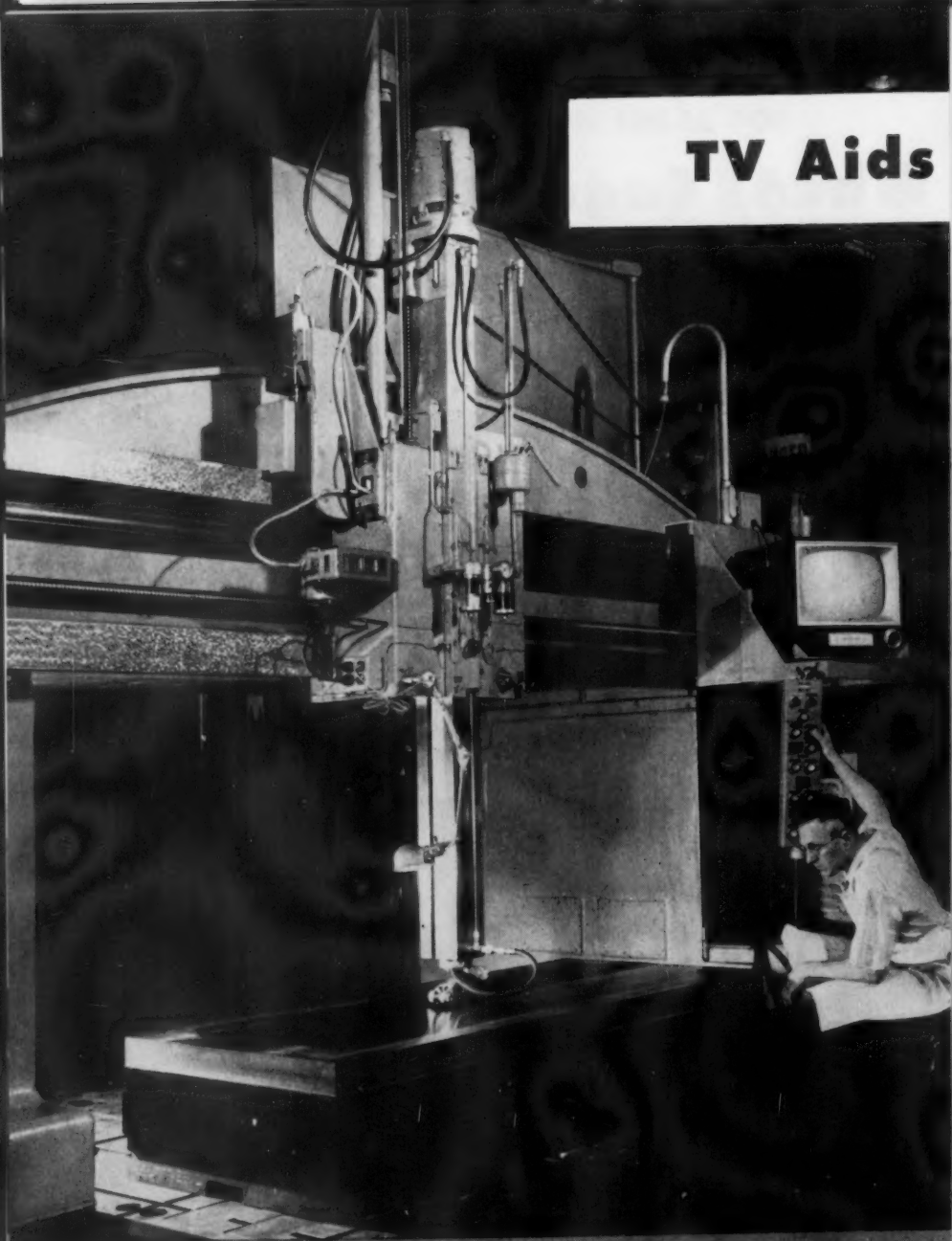


Fig. 3 — Specially tooled 30 kva. bench welders join two stampings with 38 welds.

TV Aids



This view shows the special die-layout machine laying out a comparatively small die, measuring 33½ inches in width, 16 inches in thickness, and 73 inches in length.

in Huge Die Production

Special die-layout machine installed at Alcoa's Cleveland Works takes advantage of television to achieve push button-controlled accuracy in laying out forging dies.

Television's unwavering eye today is helping the Aluminum Company of America produce huge, costly dies with an unusually high degree of accuracy. At Alcoa's Cleveland Works, the broad screen of a 17-inch TV receiving set glows from the control platform of a unique, newly developed die-layout machine. The set flashes pictures beamed by three cameras that are trained on finely calibrated scales. With this assist from television, the operator can check, to a thousandth of an inch, the machine's position as it locates dimension points on a hardened steel die block. Dies so large they were considered impossible a decade ago are now produced to extremely close tolerances by Alcoa.

Said to be the first of its kind, the die-layout machine was developed by Alcoa and the Consolidated Machine Tool Division of Farrel-Birmingham, Inc., to simplify a painstaking, manual operation.

The unusual machine can move in three directions as it lays out the dimensions of a proposed aluminum

forging on the smooth face of a steel die block. Television cameras are installed to focus on three vernier scales. They constantly track the position of the machine's scriber as it inches across the surface of die blocks that can reach 10 feet in width, 22 feet in length, and more than 3 feet in thickness.

The images, magnified to ten times actual size, are transmitted to the receiving set on the operator's platform. Selecting each of three channels in turn, the operator quickly spots the longitudinal, vertical, and transverse position of the scriber. Checking frequently, he lays out, with push-button precision, lines that later guide a cutting tool during the actual die sinking.

The versatile machine's application has been broadened by the development of auxiliary tools that can be used in the spindle. They include pencil type scribers and center point prick punches, air pressure regulated rolling scribers, transit-type optical alignment telescopes, vernier scribers for scribing large radii, and various other tools.

Cost-Saving Setup For Assembling Pepper Mills

Hydraulic press with simple interchangeable tooling used.

By HOWARD WULFING

Shop Superintendent, George S. Thompson Corp., South Pasadena, California

(Right) Operator is shown staking pepper mill lids using a hydraulic press setup.

(Below) Exploded view of parts of pepper mill shows sub-assembly jobs to be completed.



The cost of producing pepper mills at The George S. Thompson Corporation, manufacturer of the famous Olde Thompson line of gifts and accessories, has been reduced by 11 cents on each mill produced through the use of a setup comprising a Denison hydraulic Multipress equipped with simple interchangeable tooling. Previously used methods for three sub-assembly operations cost a total of approximately 15 cents per unit. Present costs with the hydraulic press are approximately 4 cents for the three operations. Not only is this cash savings significant, but, in addition, rejects have been virtually eliminated and production has been substantially increased.

The three sub-assembly opera-

tions performed on the 4-ton hydraulic are (1) staking and pressing the pepper mill lid; (2) assembling the rotor and shaft; and (3) staking the stator sub-assembly. With the formerly used method, the cost of staking and pressing the pepper mill lid was \$.0208 per unit. With the presently used hydraulic method, the cost is \$.0159, or a unit savings of \$.0049. The press is equipped with an automatic index table, and the high finished chrome lid is placed on a holder by the woman operator. As she puts one lid on the holder with her left hand, she removes another lid with her right hand. The production rate on this operation is 41 parts per hour, for an hourly saving of 20 cents.

In the rotor and shaft assembly



operation, the function of the press is to force the shaft into the rotor. The operator simply loads the pre-assembled parts on the holding fixture on the index table, and the press does the rest. The holding fixture is designed to nest the rotor with the splined end of the shaft protruding. The ram action of the press forces the shaft into the rotor. With the previously used method, the cost was \$.0720 per assembly. With the hydraulic press method, which produces 91 sub-assemblies per hour, the cost is \$.0043 per unit for a savings of \$.0677 per part. The hourly savings with the hydraulic press method is approximately \$6.50.

The operation of staking the stator sub-assembly calls for firmly

fastening the stator into the pepper mill base. Formerly, two screws were driven by an operator using an automatic screw driver. Using this hand method, the cost per part was \$.0543. With the method now used, the part is placed on the holding fixture of the index table and the two cold screws are driven by the ram action of the press. Production on this part is now 37 per hour at a cost of \$.0175 per part. The unit savings is \$.0368, and the hourly saving is approximately \$1.25.

The holding fixtures on the press index table are completely interchangeable. By simply loosening a set screw, each of the three different fixtures can be put into operation almost immediately. This feature means that the press can be used

Assembling Pepper Mills . . .

Holding fixtures for index table allow quick change-over for small production runs. At the right is fixture for rotor and shaft assembly. In the center is cushioned holder for staking of pepper mill lids. At left is holder for staking stator sub-assembly.

for short-run jobs as the production of a particular item requires. The press is in operation approximately 8 hours a day and, in any one day, the three parts mentioned above are sub-assembled on that press. The hourly saving over former methods is approximately \$8 an hour, or about \$320 a week.

★ ★ ★

Tool Design. Second Edition. By Cyril Donaldson and George H. LeCain. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. 557 pages. Cloth binding, board covers. Illustrated. Price, \$6.75.

This textbook was written at the Rochester Institute of Technology

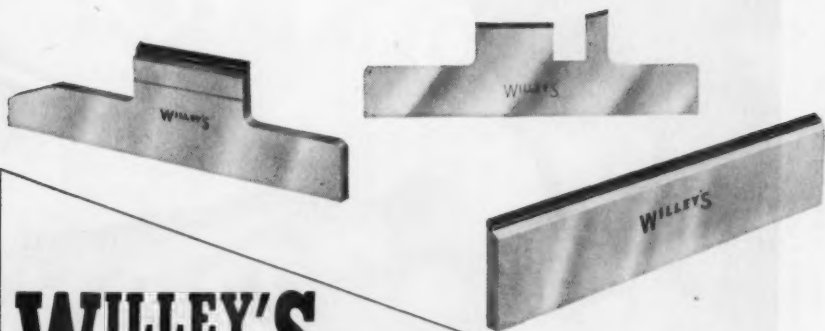
as part of its program for developing teaching materials which are practical in nature and closely related to requirements of industry.

General methods of tool design which enable the student to develop ideas into practical specifications for modern manufacturing methods form the basis of this work. An attempt is made to broaden the bases of study as much as possible, and for this reason, topics that may be dealt with in other courses, such as springs, welding, and tolerances, are included insofar as they apply to tool design.

This complete text for a course in tool design was written especially for class study with questions, problems, drawing assignments, and references. Each topic is developed in logical order and supplemented with drawings and worked-out examples. The principles and fundamentals of strength of materials as they apply to the practice of tool design have been included. Emphasis is placed on the importance of tool design in relation to the economical manufacture of products.

In this second edition the material on punches and dies, theory of cutting tools, jigs and fixtures, and screw machines has been rewritten and expanded. The section on tool materials has been largely revised, and a special table aids the beginner in choosing materials at the beginning of a design. New derivations of formulas have been added to the chapter on gages.

Engineers whose work concerns tools, jigs and fixtures and gages, as well as those who must work with or supervise tool designers, will find this volume most helpful.



WILLEY'S CARBIDE WORK SUPPORT BLADES FOR CENTERLESS GRINDERS

FROM STOCK standards & specials

**Thru-Feed • In-Feed • Long-Bar
Tube & Rod • Roller In-Feed
Race • Power Race
Heavy Duty**

**WORK
SUPPORT
BLADES**
for special application

Willey's have pioneered in the development and manufacture of carbide work support blades. Seasoned toolmakers with "know-how" build these tools for standard as well as for special applications. Many centerless grinding operations require special carbide tipped work support blades for work such as: multi-diameter—angular—form—tapered or radius grinding.

RECONDITIONING SERVICE

Willey's regrind or carbide re-tip your worn out, chipped, broken or damaged work support blades to original accuracy . . . smooth—straight and parallel. For more than 20 years Willey's customers have used this service, often having the same blade reconditioned many times . . . a service and savings available to you too.

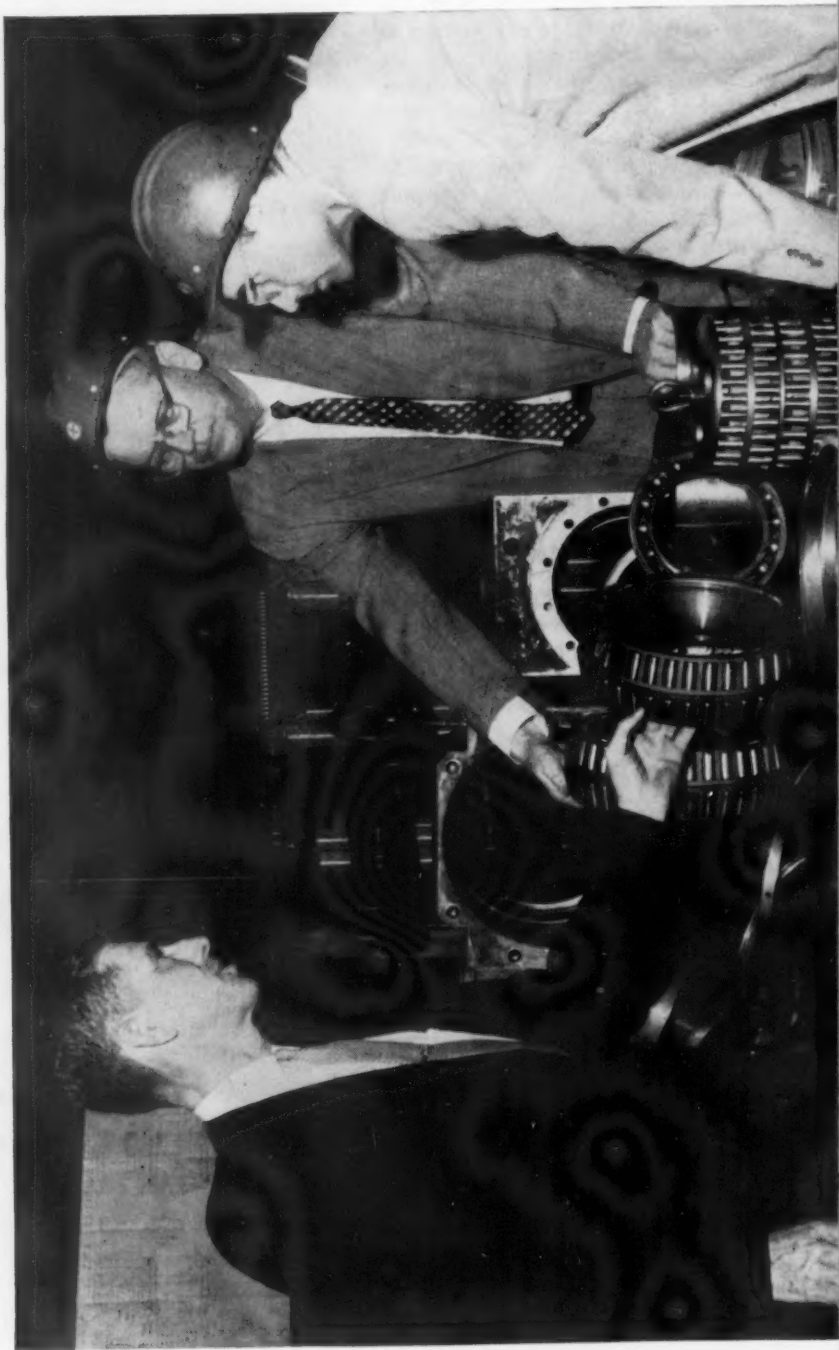
Write for complete
illustrated catalog
and price list



**WILLEY'S
CARBIDE TOOL
COMPANY**

1340 WEST VERNOR HIGHWAY • DETROIT 1, MICHIGAN
WOodward 1-9444

For more data circle 397 on Reader Service Card



Bearings, Inc. customers . . . are the best "price buyers" in business!

Take this steel mill as a good example. The Superintendent of Mechanical Maintenance and the Master Mechanic shown above talking to our sales representative, buy many bearings at competitive prices from Bearings, Inc. every year. By using our services to their fullest extent . . . By accepting the knowledge of Bearings, Inc. engineers, they get a "value added" that makes their bearing purchases far less expensive than can be supplied by most other distributors.

Here are some of the services Bearings, Inc. is continually performing for this mill:

- An original survey, made before a new rod mill went into operation, catalogued each of the 8,000 bearings in the mill as well as oil seals and bronze bushings. A weekly recap keeps the inventory up to date.
- Reducing duplication and elimination of bearings no longer needed through periodic checks.
- Suggesting methods which have improved quality of product, lessened maintenance costs and lengthened machinery life.
- Conducting educational meetings among plant workers, showing them how they may cut maintenance costs.
- Re-wrapping stock to keep out dirt.

- Availability for consultation about plant problems. A telephone call will bring the Bearings, Inc. man in a hurry if the problem cannot wait until his regular call.
 - Helping set up a preventive maintenance system enabling this steel mill to find potential breakdowns before they happen.
 - Relocating stockrooms for greater efficiency.
 - Standardizing bearings wherever possible.
- Most of our customers know and use these services.*
- A call to our nearest branch will make them available to you!

Providing bearing service in the territories adjacent to our branches, listed below.


BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore

DELAWARE: Wilmington •

Subsidiaries: Balanol Corp. • Buffalo, N. Y. •
Kentucky Ball and Roller Bearing Co. • Louisville, Ky.





Lightweight magnesium fixture checks Ford station wagons

This magnesium checking fixture is used by Ford Motor Company in assembling Ford two-door station wagons.

It helps to maintain quality by checking the daylight opening relationship to the glass run channel and regulator retainer brackets in the quarter panel welded assembly. It assures accurate location of the glass run retainers and window regulator mounting holes. The fixture is dimensionally stable and has stood up well under continuous rough handling. One man can easily lift and

manipulate it with one hand.

Jigs and fixtures made with magnesium are always easy to handle because they weigh much less than steel or aluminum. Magnesium tooling plate is uniformly flat, low in cost and easy to machine, fabricate and weld.

For the full story on magnesium tooling plate contact your nearest supplier of Dow magnesium or write to us.

THE DOW CHEMICAL COMPANY, Midland, Michigan, Department MA 1416V-1.

AVAILABLE FROM STOCK AT: Copper and Brass Sales, Inc., Detroit, Michigan

Hubbell Metals Inc., St. Louis, Mo.

Vinson Steel and Aluminum Co., Dallas, Texas.

A. R. Purdy Co., Inc., Lyndhurst, N. J.

Fullerton Steel and Wire Co., Chicago, Ill.

Reliance Magnesium Co., Los Angeles, Calif.

YOU CAN DEPEND ON

DOW

For more data circle 401 on Reader Service Card

Know Your

Tool Signatures

Premature cemented carbide tool failure can be greatly minimized by proper tool geometry.

By R. J. MOESSNER

Metallurgical Products Department,
General Electric Company, Detroit, Michigan

Many times a cemented carbide tool fails prematurely. The reason is improper tool geometry in 40 per cent of the cases. Sometimes this is the result of bad grinding practice. In this case, the problem is easily corrected by improved grinding techniques. Other times this is the result of tool engineering.

Cutting tool people generally accept as standard a tool signature. These appear as in the accompanying table. The tool signature is always written in the order given, the angles separated by a comma, a dash indicating a negative angle. These angles, of course, indicate the angles that the tool cuts with, and need not be the angles on the tool shank.

For instance, a 45° side cutting edge angle boring tool held in a 45° bar cuts with a 0° side cutting edge angle, so in the tool signature the side cutting edge angle would be listed as 0°. Knowing these angles can save a lot of tools and stop tooling problems before they start.

Back rake is always listed first

and ranges from negative 40° to positive 10°; negative angles greater than 7° are often combined with positive side rake and a side cutting edge angle. These angles may be combined to give a positive true rake and they are often so used when machining austenitic steels. The results are free chip flow, strong shock resistant cutting edge, and a tendency to reduce work hardening.

Side rake is listed second and ranges from negative 7° to positive 15°. A positive rake produces a freer cutting tool, but reduces the included edge angle. Negative rake results in increased cutting forces, but makes a more shock resistant tool.

End relief is listed third and ranges from 5 to 12°. Side relief is listed fourth and also ranges from 5 to 12°. Both of these last two angles should be kept the same, if it is at all possible. Use relief angles of 5 to 7° on almost all cast irons and steels. Larger relief angles are in order on soft materials such as aluminum, magnesium, plastics and

on some low carbon steels. Large relief angles result in somewhat better tool life provided chipping is not encountered.

End cutting edge angle is listed next. Angles from 8 to 15° are used on most standard tools. This angle must, of course, be increased if the tool is to follow a cam or profile. The end cutting edge angle must be at least 6° larger than the greatest plunge angle.

Side cutting edge angle is in the sixth spot. This angle can range from 0 to 60° or more, and is changed or varied more than any other tool angle. It has a great effect on cutting speed or tool life. As the

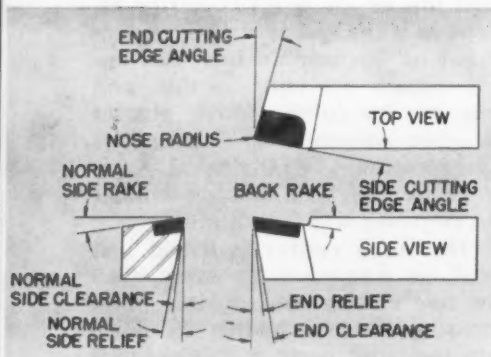
angle is increased, the speed, or feed, can be increased for a given tool life, or the tool life can be increased if the speed, or feed, remain constant. Because an increased angle causes the chip to thin and changes the cutting forces, chatter is often encountered. This chatter can sometimes be eliminated by increasing the feed, but, of course, more power will be required.

The nose radius is listed last and has somewhat the same effect as side cutting edge angle. By increasing the nose radius the finish on the work parts will improve if chatter is not encountered. The nose radius usually can be determined

Tool Signature Table

	Back Rake,	Side Rake,	End Relief,	Side Relief,	End Cutting Edge Angle,	Side Cutting Edge Angle,	Nose Radius
	TYPICAL BRAZED TOOL						
	0°,	6°,	7°,	7°,	15°,	15°,	3/32
	TYPICAL DISPOSABLE TOOL						
	-5°,	-5°,	5°,	5°,	15°,	15°,	3/32
MATERIAL CUT	RECOMMENDED ANGLES						
Medium to high carbon and alloy steel at normal speeds	-5° to 0°,	-5° to 6°,	5° to 7°,	5° to 7°,	8° to 15°,	0° to 60°,	"
Carbon and Alloy steels at slow speeds	-5°,	-5°,	5° to 7°,	5° to 7°,	8° to 15°,	0° to 60°,	"
Low carbon and free machining steels	0° to 5°,	6° to 10°,	7° to 10°,	7° to 10°,	8° to 20°,	0° to 30°,	"
Cast iron and malleable iron	-5° to 0°,	-5° to 6°,	5° to 7°,	5° to 7°,	8° to 15°,	0° to 60°,	"
Non-ferrous	0° to 10°,	6° to 15°,	7° to 12°,	7° to 12°,	8° to 25°,	0° to 30°,	"
Austenitic Stainless Steel	0° to -40°,	-5° to 10°,	5° to 7°,	5° to 7°,	8° to 15°,	0° to 60°,	"
Note: High negative back rake is usually combined with positive side and large side cutting edge angle to produce shear type tool.							
Martensitic Ferritic Stainless	0° to -5°,	6° to -5°,	5° to 7°,	5° to 7°,	8° to 15°,	0° to 60°,	"

Know Your Tool Signatures . . .



Sketch showing location of tool signatures.

in a quick and easy manner with the use of a nomograph.

The recommended angles shown

in the accompanying table are only suggested starts, and should be varied as necessary in order to meet individual needs.

★ ★ ★

Optical Micrometer for Three-Dimensional Measurement

A direct reading optical micrometer has been built at the Naval Ordnance Laboratory, Silver Spring, Md., for the location of points on large machined surfaces in three dimensions. A massive, precision instrument weighing 150 pounds, the new micrometer was constructed to solve measurement problems requiring three dimensional measurement.

★ ★ ★ ★ ★

the new LOW PRICED OMEGA JIG BORER with the Giant Sized Table 20" X 32" WORKING AREA

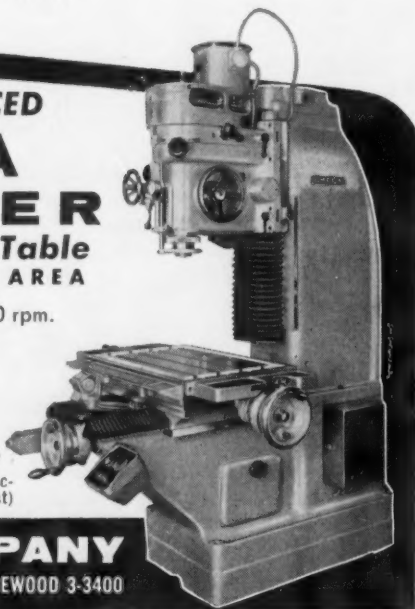
- 16 Spindle speeds from 35-1500 rpm.
- Hardened and ground screws
- Trays for dial indicators and measuring rods, motor and controls, included.

PRICE fob, New York **\$8600.00**

Optical measuring system with overall accuracy of .0002" (available at additional cost)

AMITool COMPANY

629 MAIN STREET, WESTBURY, L.I., N.Y., EDGEWOOD 3-3400



For more data circle 402 on Reader Service Card



LOOK AT IT CALMLY

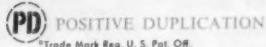
No sense being disturbed by GRINDING WHEEL PROBLEMS when there's an easy solution in sight. Switch to CINCINNATI (PD)[®] WHEELS. Now Cincinnati Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

You'll see for yourself *why* everybody's talking about (PD) WHEELS. Through the CINCINNATI (PD) Manufacturing process you are assured Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So if you want to keep calm in the face of Grinding Wheel problems, see your CINCINNATI Grinding Wheels Distributor. He'll be glad to explain how (PD) WHEELS can save you money and increase production. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you



A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



CINCINNATI[®]
Grinding Wheels

For more data circle 403 on Reader Service Card

"The novel instrument can be used to measure thicknesses and surface variations without pressure on the object examined."

Like a toolmaker's microscope it employs a mechanical stage for horizontal measurement and a vertical movement. The conventional microscope is replaced by means of the new apparatus, which is designed to measure vertical distances by optical means.

The novel instrument can be used to measure thicknesses and surface variations without exerting pressure upon the object being examined. It can be adapted to a machine tool to take measurements during machining operations without removing the piece. In addition to point location and measurement, profile surveys of an entire bearing surface can readily be made.

An image of the surface point under view through the optical eyepiece is reflected through two objective lenses, over reflecting mirrors, and through a common beam splitter. The two images are then superimposed on a microscope eyepiece equipped with a cross-hair. Positioning of the superimposed images is controlled by the vertical micrometer screw. When the image coincides with the cross-hair, a reading is taken from the micrometer dials.

Reference points on the surface being examined may be provided by physical characteristics or marks. Where it is not desirable to make reference marks on a surface, an artificial mark can be created by a built-in optical method. An image is projected upon the surface in the

form of a cross of light. The point on the object where this mark is projected is the point at which the height measurement is made for reference.

By moving the object in one direction along a horizontal plane and measuring height simultaneously, the true profile of the object can be determined. By moving the object in the other horizontal direction, the complete surface of the object is revealed. The optical apparatus is employed as a precision indicator. Actual measurement is made with the micrometer screws on the stages. Counters on each stage screw give carriage movement in thousandths of an inch. Ten thousandths inch are read from vernier dials.



Operator surveys profile of bearing surface with new optical micrometer built at Naval Ordnance Laboratory, Silver Spring, Md.

Stop tap breakage and scrap

SCULLY-JONES

SAFE-TORQUE DRIVERS

NOW AVAILABLE IN NEW STYLES
AND CAPACITIES

These benefits . . .	for these reasons . . .	result from these PREMIUM features
PREMIUM TOOL LIFE	Reduce tap breakage.	1. One-shot clutch and cam-drive collet completely disengage tap from driver.
	Control adverse tapping conditions.	2. Pre-set torque remains constant. Wide range of settings.
PREMIUM QUALITY TAPPED HOLES	Produce uniform, accurate threads.	3. Freewheeling action eliminates impact and objectionable vibration.
	Help prevent use of dull or improperly sharpened tap, or wrong tap for job.	4. Releases instantly at proper setting.
PREMIUM PRODUCTION EFFICIENCY	Operator gains confidence, more free time for other work.	5. Tension and compression type compensates for feed variation between spindle and tap.
	Use higher speeds on all tapping jobs.	6. No noise or impact on release. Tension and compression type spring loaded.
	Reduce down-time.	7. Operates at any speed taps can take.
		8. Gives dependable control over adverse machining conditions.
PREMIUM PROFIT OPPORTUNITY	Driver has long service life.	9. Quick-change type — change tools without stopping machine.
		10. Freewheeling action minimizes wear.

**SCULLY
JONES**

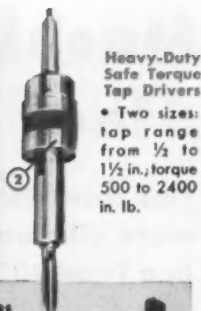
Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

PRECISION HOLDING TOOLS

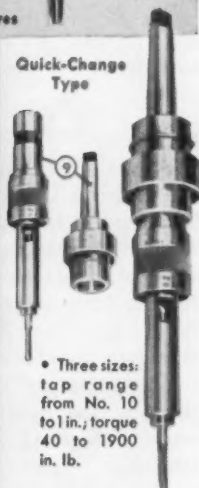
"Precision Holding" for holding precision

Scully-Jones and Company, 1909 South Rockwell St., Chicago 8, Ill.

For more data circle 404 on Reader Service Card



Heavy-Duty
Safe Torque
Tap Drivers
• Two sizes:
tap range
from 1/2 to
1 1/2 in.; torque
500 to 2400
in. lb.



Quick-Change
Type
• Three sizes:
tap range
from No. 10
to 1 in.; torque
40 to 1900
in. lb.



Tension
and
Compression
Type
• Two sizes:
tap range
from No. 10
to 3/4 in.;
torque 50 to
700 in. lb.

Machining Stainless Steel

This case history points out how difficulties were eliminated in tapping a blind hole in a Type 303 stainless steel part.

By G. J. STEVENS

Machining Engineer, Armco Steel Corporation

Problem:

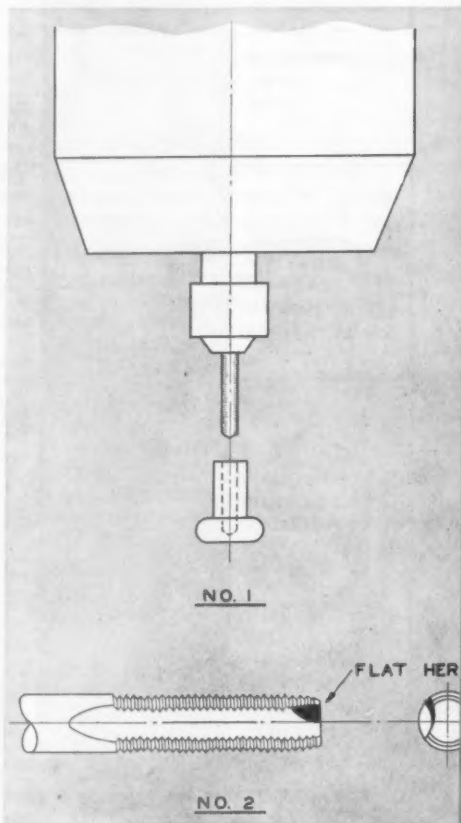
A machine shop was having trouble tapping Type 303 stainless steel. The operator was using a conventional tapping head mounted on a drill press. It required an 8-32 tap to penetrate 9/16 inch to a bottom hole. (See sketch No. 1 of the accompanying drawing.)

Chips packed the bottom of the part, which made necessary a secondary cleaning operation. Poor tap life and frequent breakage because of the short lead on the tap increased the difficulties.

Solution:

After a few experimental tap grinds, a method was found to eliminate the difficulties. The short-lead two-flute gun tap was ground with a flat, as shown in sketch No. 2. This changed the gun grind from a hook to a zero degree rake angle. This is often done for tapping brass or other non-ferrous metals.

The new type of grind broke up the chips and eliminated packing at the bottom of the hole. The tap also performed much better and tap breakage was reduced considerably.



Grinding a flat on end of short-lead two-flute tap eliminates chip-packing problems in tapping blind hole in stainless part.



NEW

Surface grinder gives you
LARGE CAPACITY
at **LOW cost...**

COVEL

No. 17

10" x 16" HAND FEED

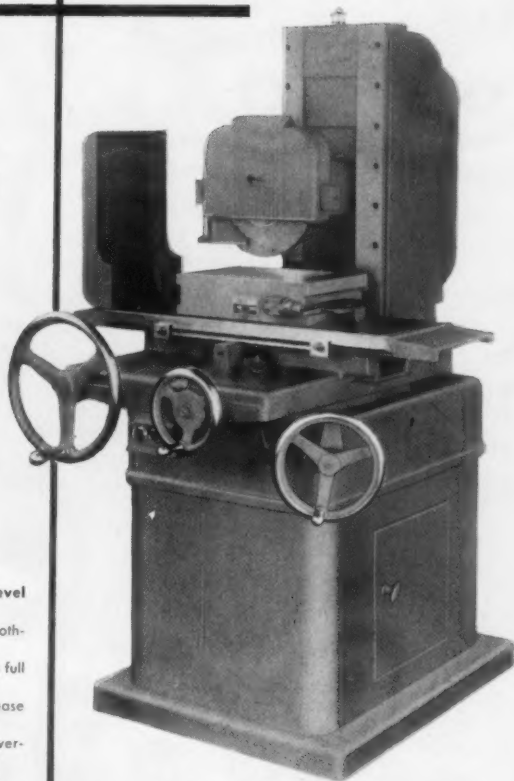
Set-up time and operator effort are reduced while accuracy is increased by the advanced Covel design features incorporated in this new surface grinder. You can handle die block and general tool room work with remarkable efficiency and speed with the new Covel No. 17 which gives large capacity at low cost.

Note these advanced Covel features:

- Elevating handwheel is below table level for extra convenience.
- Timing belt drive actuates table for smoother grind.
- Large diameter handwheel moves table full 16" with only 2 3/4 turns.
- Precision ball-bearing spindle is grease lubricated—sealed for life.
- Hardened and ground lead screws on vertical and transverse feeds.

WET ATTACHMENT AVAILABLE

- Hard chrome table ways can be furnished to eliminate need for periodic re-scraping.



Work Capacity
10" x 16" x 14"

Grinding Wheel
12" x 3/4" x 3"

Spindle Motor
2 H. P.

Spindle Speed
1750 RPM

- Learn all the facts about the Covel No. 17. Ask for Bulletin 17MM87.

Covel Offers the Widest Choice in Surface Grinders up to 14" x 24" • Cutter and Tool Grinders • Drill Grinders • Optical Comparators.

COVEL

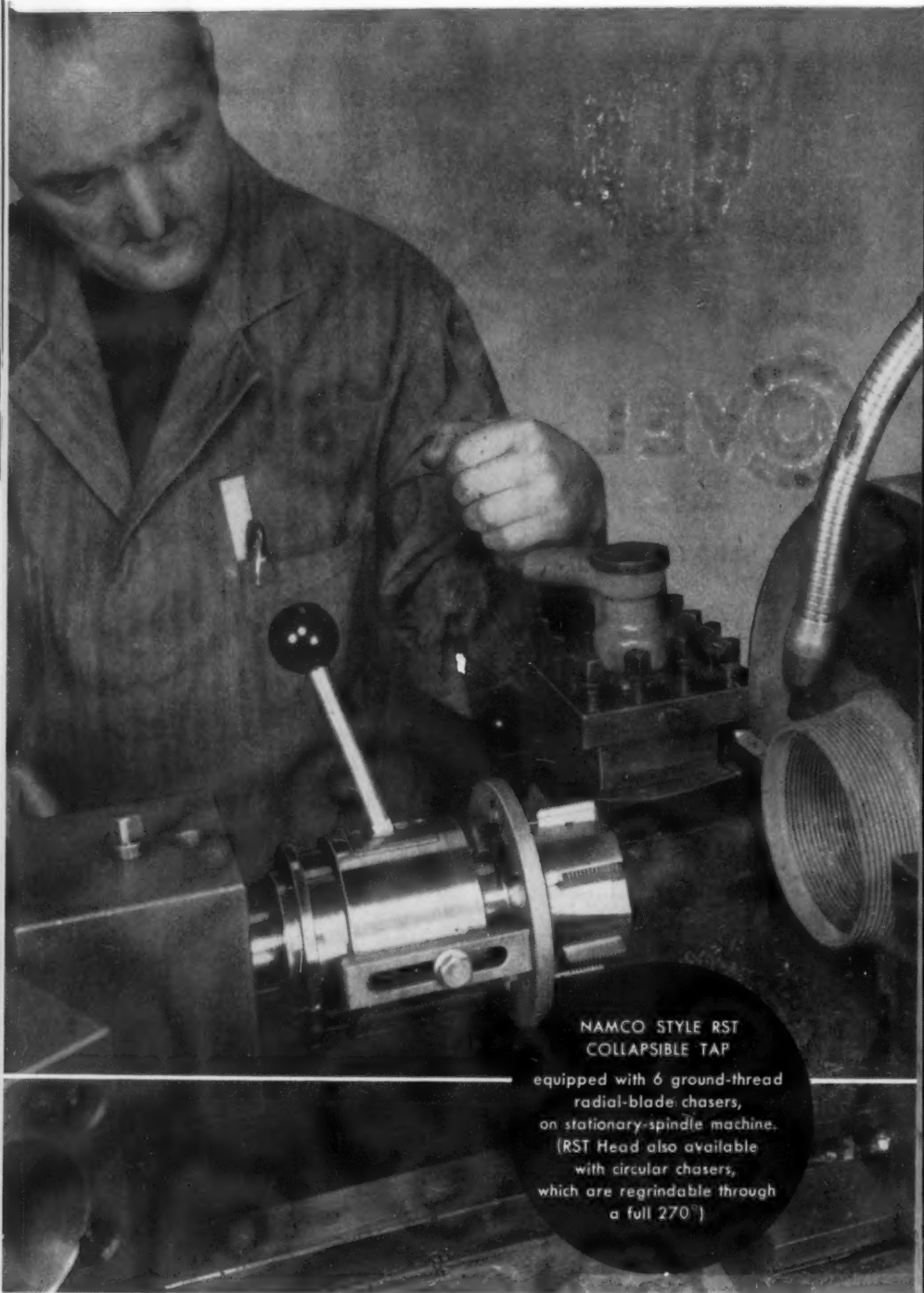
**PRECISION
GRINDERS**

BENTON HARBOR, MICHIGAN

For more data circle 405 on Reader Service Card

August, 1957

modern machine shop 141



**NAMCO STYLE RST
COLLAPSIBLE TAP**

equipped with 6 ground-thread
radial-blade chasers,
on stationary-spindle machine.
(RST Head also available
with circular chasers,
which are regrindable through
a full 270°)

Namco **COLLAPSIBLE TAPS**

(FOR ROTATING OR STATIONARY-SPINDLE MACHINES)

for smooth, clean thread form . . .
fine fit . . . uninterrupted tapping . . . on
long or short runs

POSITIVE PRECISION— Compact construction and unique core piece design assures rigid, full-length chaser support; heavy body supplies ample side support.

NO TIME LOST— Positive, trigger-like collapsing action *at instant cut is finished* eliminates drag . . . provides fast, unmarred threading on all types of horizontal or vertical machines, at maximum machining speeds.

ACCURACY EASILY MAINTAINED— Minimum number of parts, hardened and

precision-ground throughout, assures less wear—greater accuracy. Less down time because replacements are fewer and easier.

QUICK ACCURATE ADJUSTMENT for all diameters within range of head. One screw adjusts all chasers, *simultaneously*, to precise diametric requirement.

VERSATILE— Same RST Head can be used on either stationary or revolving-spindle machines.

A WIDE RANGE OF SIZES AND TYPES



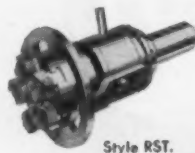
Style RSA.

Solid, adjustable.
Range 1 1/4" to 4".



Style RST.

With radial blade chasers.
Range 1 1/4" to 4".



Style RES.

With circular chasers.
Range 3" to 5".



Style RES-L. Range:
With radial chasers,
2 3/4" to 4"; with
circular chasers,
4 1/2" to 13 1/2".

For detailed information, ask for Bulletin DT-52

National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, N. J. • Chicago 6, Ill. • Detroit 27, Mich.

For more data circle 407 on Reader Service Card

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

"Fishtail" Drill for Sheet Metal

By H. J. GERBER

To prevent burr formation around the edges of holes drilled in sheet metal, we provided a standard drill with a "fishtail" grind, as shown in Fig. 1. Since the drill is not self-centering, we designed a simple jig for use in accurately guiding the drill.

The jig consists of a piece of cold

rolled steel plate or flat bar stock which is drilled and reamed to accommodate a standard hardened steel drill bushing. The layout lines for the drilled hole are extended down the sides of the bushing block, and in using the drill jig, these lines are aligned with the layout lines on the work and the block is clamped in place, as shown in Fig. 2. With this setup, the hole may be drilled quickly and accurately without any necessity of running the drill through a back-up block of any kind.

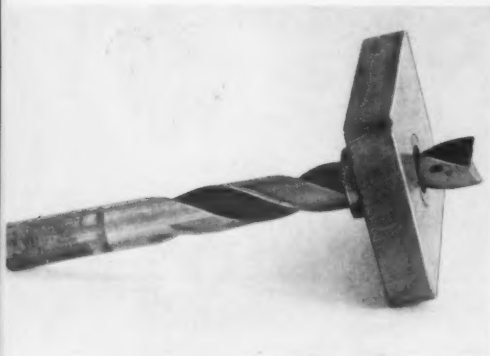


Fig. 1—Illustration showing drill ground to a "fishtail" point inserted in drill bushing of jig block used for guiding purposes.

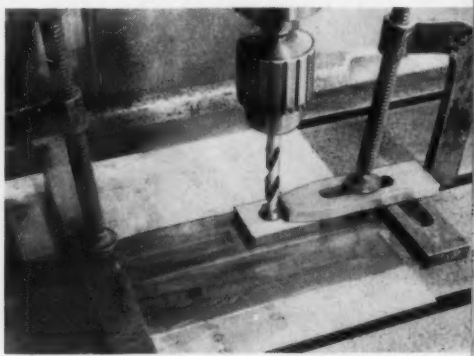


Fig. 2—Sheet metal being drilled with "fishtail" drill guided by drill bushing in jig block clamped firmly to work surface.

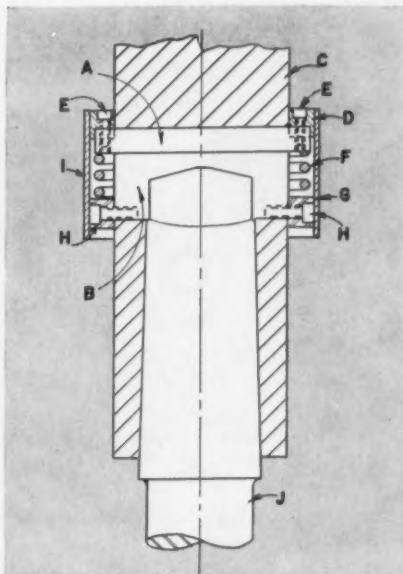
Simple Knockout Device for Tapered Shank Tools

By RICHARD MINSER

Removing large taper-shank drills from machine spindles can be a time-consuming job. In our shop, we use large back-gear drill presses primarily for odd job work; thus, drills and reamers must be frequently changed in order to accommodate the variety of operations performed.

To facilitate the task of removing the tools from the machine spindles, we installed a simple device on all of our taper-spindle drill presses. Referring to the accompanying sketch, the device consists of a hardened steel bar, *A*, which is inserted through the knockout hole, *B*, in the drill press spindle, *C*. The ends of the bar fit in recesses cut in a ring, *D*, provided around the spindle and are held in place by means of screws, *E*. As the drill, *J*, is inserted into the machine spindle, the knockout bar is held clear of the tapered end of the drill by means of a spring, *F*, which is maintained in position by the ring, *D*, and a second ring, *G*. The pressure exerted by the spring holds the knockout bar against the top of the knockout slot provided through the spindle. The ring, *G*, is held in place by means of two long screws, *H*, that bear against the bottom of the knockout slot. A housing, *I*, fastened to the ring, *D*, protects the assembly from dirt.

In use, when the spindle is raised with a quick motion, the knockout bar, *A*, strikes the end of the drill sufficiently hard to drive it from the



Sketch of simple device for quickly removing taper-shank tools from machine spindles.

tapered socket, thus enabling drills to be interchanged with a minimum of effort.

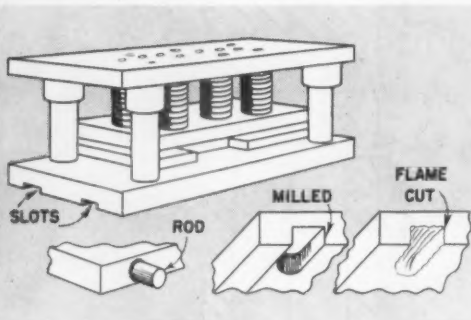
★ ★ ★

Methods for Facilitating Handling of Heavy Dies

By BUCKLEY SULLIVAN

Heavy dies can be handled easier during setup, maintenance, repair, or to and from storage with the simple methods depicted in the accompanying sketch. With one method, two slots, each approximately 2 inches wide x 2 inches long x 1 inch deep, are milled in the bottom of the die holder, thus providing pockets for inserting pry

ideas from readers . . .



Sketch showing various methods which can be used to facilitate the handling of heavy dies during setup or to and from storage.

bars for obtaining a firm hold on the die set. If desired, these slots may be flame cut instead of milled.

As another alternative, holes may be drilled in the edges of the die holder and rods welded or brazed therein.

The particular method used will depend largely on the size of the die and the equipment available. In any case, the difficult job of "inching" a die around the press during setup will be greatly speeded up.

★ ★ ★

Spring Checking Fixture

By CLIFFORD MOLLOY

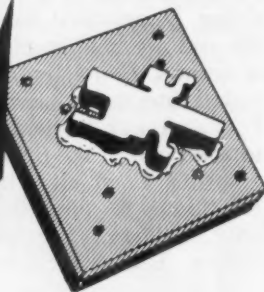
In our shop we are frequently called upon to produce quantities of springs which must duplicate samples supplied by the customer. In order to provide a convenient

USE CERRO ALLOYS

and save time and money — in making blanking dies . . .

or

**CERROMATRIX saved
16 hours in making
this blanking die**



- locating bearings and non-moving parts in machinery
- making chuck-jaws
- bending thin-walled tubing
- making molds for plastics
- proof-casting forging molds, dies, etc.

or doing any of 63 well-known metal-working jobs.

Send for free folder: "63 JOBS YOU CAN DO BETTER WITH CERRO ALLOYS"



CERRO DE PASCO SALES CORPORATION

304 Park Avenue, New York 22, N. Y.

For more data circle 408 on Reader Service Card

August 1977 143
modern machine shop

cut it with

CAPEWELL



band saw blades

THE USER: Taywood Steel Products, Inc., Bell, Calif.

THE MATERIAL: A. Milne & Co. Solid and Hollow Tool Steels

THE JOB: Minimum 1/2" saw cut waste

THE PROBLEM: To eliminate uneven cuts and short blade life

THE ANSWER: Capewell Cravenized Metal Cutting Band Saw Blades

THE RESULT: Extreme accuracy—many cuts per blade—faster cutting

Capewell Band Saw Blades can give you production bonuses, too. Available in regular, skip or shark tooth design, Capewell blades stay sharper longer and give more cuts per blade. Tooth by tooth, Capewell blades are a superior product, manufactured to rigidly controlled specifications—insist on Capewell for proved maximum saw performance and production economy.



**SOLD ONLY THROUGH
CAPEWELL DISTRIBUTORS**

*who provide: complete inventory
... engineering assistance
... delivery when you need it.*

THE CAPEWELL MANUFACTURING COMPANY
Hartford 2, Connecticut

Please send complete details on Capewell Band Saw Blades to:

NAME _____

COMPANY _____

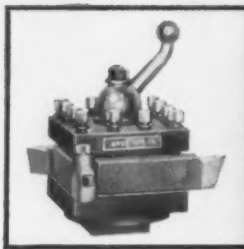
ADDRESS _____

CITY _____

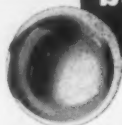
ZONE _____

STATE _____

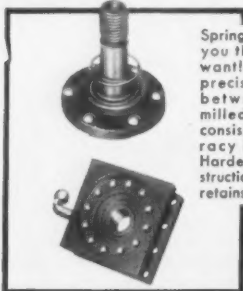
Enco Turrets Assure ±.0005" Accuracy



by
being
on the
ball!



Enco's passion for exacting accuracy is paying off in metal working operations everywhere! Combining precision lathe output with efficiency and economy has become a necessity . . . and Enco turrets have proved the ideal answer. An Enco turret transforms one lathe into a production machine, each operation of unsurpassed accuracy due to *spring loaded ball design!*



Spring loaded balls give you the accuracy you want! Hardened steel precision balls locked between accurately milled spherical seats consistently give accuracy in re-indexing. Hardened all steel construction minimizes wear, retains built in precision.

Write today for catalog No. 53. There's an ENCO turret for every lathe.

ENCO

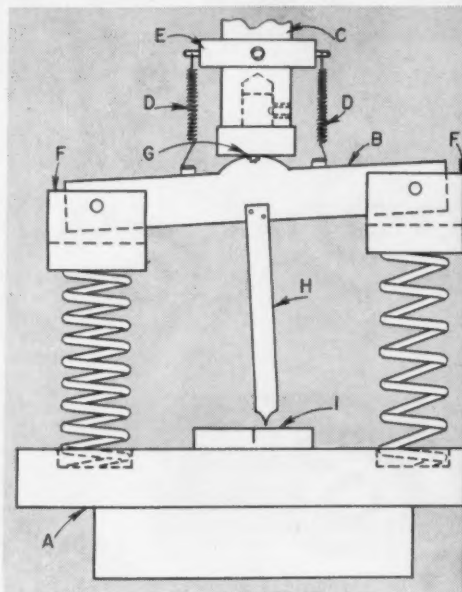
Manufacturing Company, 4520 W. Fullerton Ave.
Chicago 39, Ill., Dept. 187

For more data circle 410 on Reader Service Card

ideas from readers . . .

method of comparing the springs with the samples, we designed the fixture shown in the accompanying sketch.


Intended for use in an arbor press, the fixture consists of a base plate, *A*, which is mounted on the bed of the press. A cross bar, *B*, is held against the end of the press ram, *C*, with two small tension springs, *D*, attached to a collar, *E*. Each end of the bar, *B*, carries a swiveling shoe, *F*, the shoes being arranged so as to contact the tops of the springs being compared. A raised portion in the center of the



Sketch of simple fixture designed for use in an arbor press for comparing stiffness of manufactured spring with sample spring.


JIG-TIME

DELIVERY

SAME DAY Shipments—Standard  drill jig bushings from our FACTORY and conveniently located WAREHOUSING DISTRIBUTORS.

SPECIAL sizes get top priority SERVICE.

CAREFUL manufacture—from WEAR-RESISTANT, chrome alloy bearing steel.

 drill jig bushings meet the most rigid standards of PRECISION and DURABILITY.

Write or phone for a catalog and price list today!

ACCURATE BUSHING COMPANY

442 NORTH AVENUE / GARWOOD, NEW JERSEY



For more data circle 411 on Reader Service Card

ideas from readers . . .

bar, *B*, permits the bar to rock on a pin, *G*, located in the center of the press ram, the pin having a rounded end which fits into a hole provided in the raised portion of the

cross bar. This construction keeps the cross bar centered under the press ram. A pointer, *H*, fastened to the cross bar and a witness line provided on a block, *I*, on the base plate serve to indicate whether the spring that is being checked is either stiffer or softer than the sample.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Huge Measuring Machine for Jet Engine Production

The 12-foot measuring machine shown herewith was shipped recently by the Pratt & Whitney Co., Inc., West Hartford, Conn., to the Aircraft Gas Turbine Division of General Electric Company at Evendale, Ohio, where it will be

used for the inspection of jet engine parts. The machine, with a measuring capacity of 144 inches, reads directly to 0.00001 inch with controlled measuring pressure. Essentially, the machine consists of a master base, measuring head and Electrolimit tailstock, all mounted on a seasoned rigid base.

For more data circle 94 on Reader Service Card



This P & W 12-foot measuring machine was built for GE's Aircraft Gas Turbine Division.

Question: Which is a Bearing-izing tool?



*Answer: All four are Bearing-izing Tools! **

Remember . . . COGSDILL BEARING-IZING TOOLS are engineered for each application to meet your requirements. As no two problems are exactly alike . . . also no two Cogsdill Bearing-izing designs are exactly alike. Our experienced Engineering Staff design the tool for finishing bores, thrust faces and some contours to less than 10 RMS with accuracy to low tenths, to meet your special problems.

- * 1 Flat surfaces & multiple diameters. 2 Angular valve seats.
3 Bottoming within .015. 4 Blind or shouldered holes.

Send your part print for our recommendation



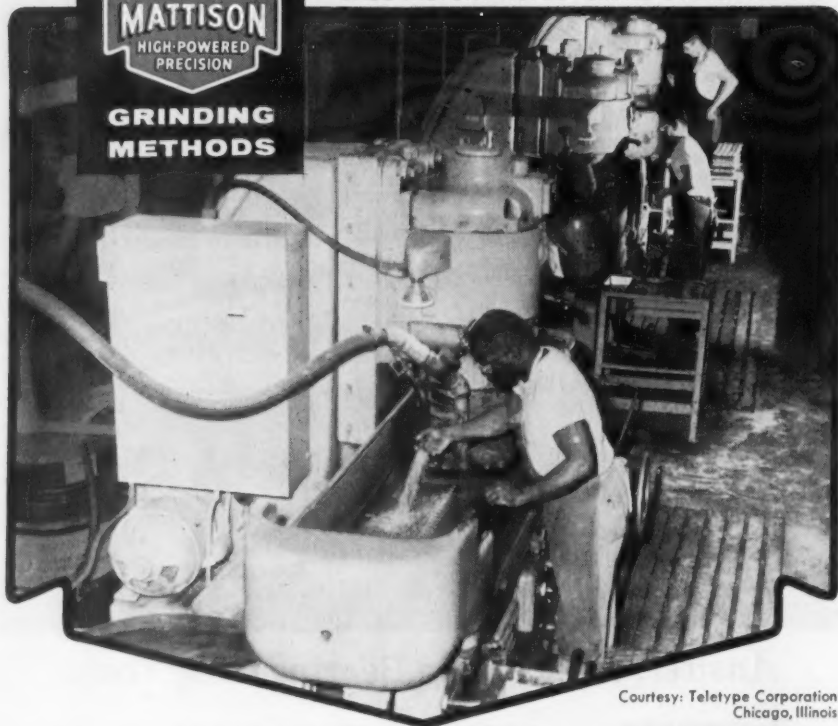
Cogsdill
TOOL PRODUCTS, INC.

12980 W. Eight Mile Road, Oak Park 37, Michigan
For more data circle 412 on Reader Service Card

MATTISON
HIGH-POWERED
PRECISION

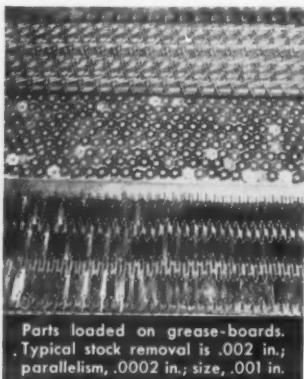
**GRINDING
METHODS**

CASE HISTORY NO. 39—SMALL STEEL PARTS



Courtesy: Teletype Corporation
Chicago, Illinois

Grease-board loading, high-powered surface grinders speed production of precision small parts



Parts loaded on grease-boards.
Typical stock removal is .002 in.;
parallelism, .0002 in.; size, .001 in.

Stamped steel parts are finish-ground to close tolerances at rates up to 700 per hour by the Teletype Corp. Use of grease-board loading and high-powered Mattison Vertical Spindle Surface Grinders makes this performance possible.

Over 2,000 varieties of parts are ground on three Mattison machines. Boards with 100 or more pieces held with axle grease are delivered to each operator. He reverses the board on the magnetic chuck to quickly load the grinder, reducing setup time. Parts are loaded on the boards right from the punch presses. Two of the grinders have been in service for ten years without a shutdown for major maintenance. Call your Mattison dealer for details.

MATTISON
MACHINE WORKS
MILWAUKEE, WIS.

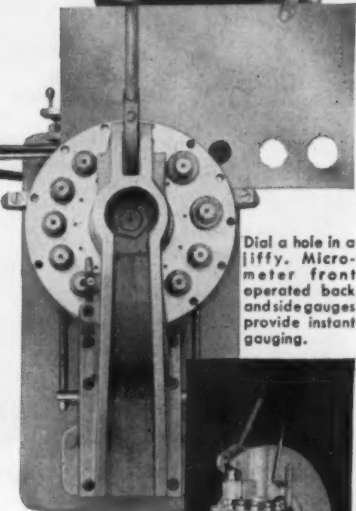


**HIGH-POWERED
PRECISION
SURFACE
GRINDERS**

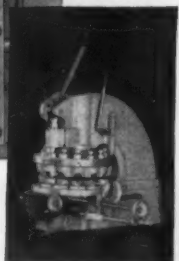
For more data circle 413 on Reader Service Card

new Di-Acro turret punch press*

Accurate Burr-Free Punching at 12 Rotating Stations



Dial a hole in a jiffy. Micro-meter front operated back and side gauges provide instant gauging.



The new Di-Acro 4 Ton Turret Punch Press provides rapid, close tolerance punching of round, square, oval and rectangular holes from 1/16" to 2".

Rotating turrets provide rapid indexing for single or sequence punching. Precision hole location quickly obtained with Micro-twin gauges. Punches sheet metals up to 16 gauge mild steel, fibre-

board, asbestos, paper, cork, leather, rubber, plastic and other sheet materials.

Dies are mounted in turrets—always handy. Standard clearance between punch and die is .002". Choice of 6 other clearances at no charge. The Di-Acro Turret Punch Press is safe, simple to operate—requires little maintenance.



Consult the Yellow Pages of your phone book for the name of your nearest Di-Acro distributor or write us for catalog describing this and other Di-Acro machines.



O'NEIL-IRWIN MFG. CO.

*pronounced die-ack-ro

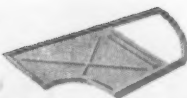
306 8th Avenue • Lake City, Minn.

For more data circle 414 on Reader Service Card

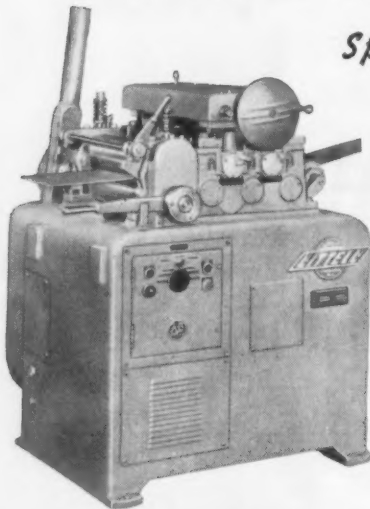
FROM COIL



TO STAMPING



THE **LITTELL** LINE

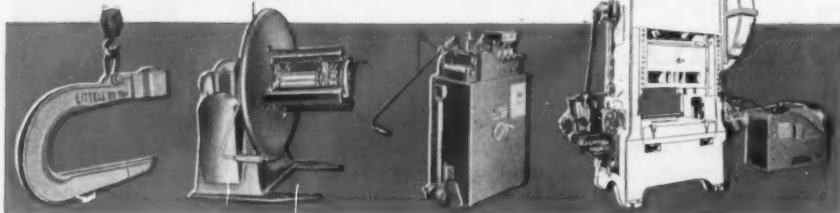


Speeds Production, Cuts Costs

Littell Hooks, Reels, Straighteners and Roll Feeds are the original key tools for flexible, productive, profitable automatic punch press operation. Here are typical units from the Littell line.

No. 418-HRP HYDRAULIC DRIVE FEEDING AND STRAIGHTENING MACHINE

Automatically straightens coil stock and feeds to any type punch press or square shear. Handles stock up to .125" thick. Feeds up to 19" lengths at 40 strokes per minute, or up to 38" lengths at 20 s.p.m. Easily moved from press to press by fork truck or crane. Operated independently. Fully described in Bulletin B-10.



HOOKS...

coil lifting capacities, 1,000 to 40,000 lbs.

REELS...

Spindle Reels for 300 to 40,000 lb. coils. Cradle reels for coils up to 30,000 lbs.

STRAIGHTENERS

...straighten coil stock 1" to 90" wide, .010" to .125" thick.

AUTOMATIC ROLL FEEDS

...Used with compound, single and progressive dies on all type presses. Handle all sizes of stock.



SAFETY WITH SPEED

REELS • STRAIGHTENING AND
FEEDING MACHINES • SHEETING
LINES • ROLL FEEDS • COIL CHARGES
DISTRICT OFFICES: DETROIT, CLEVELAND

4163 Ravenswood Ave. • Chicago 13, Illinois

For more data circle 415 on Reader Service Card

**LITTELL
CATALOG No. 56**
tells the complete
story. Write for free
copy.



Low Cost Precision Grinding Machines

made possible
with versatile,
all-purpose Series 5



DUMORE TOOL POST GRINDERS

MOUNTED ON USED MILLER BASES, the Series 5 Dumore Tool Post Grinders provide manufacturer, Scully-Jones, Chicago, with dependable high production precision grinding equipment at amazingly low cost.

- 1/2 hp continuous-duty rated universal motor
- Speeds from 4600 to 42,500 rpm
- Handles wheels from 1/8" to 5"
- Delivers accuracies to .0001", surface finishes of 6 to 8 micro-inches
- For lathes with 13" to 18" swing
- Mounts on ANY basic machine tool
- Add simple fixtures to set up low cost special precision grinding machines
- 8 other models available from 1/5 to 3 hp
- For complete details, write for catalog 55-FL

SOLD BY LEADING DISTRIBUTORS EVERYWHERE

You can do more grinding with Dumore
Grinders on any machine tool!



DUMORE®

Precision Tools

**AUTOMATIC DRILL
UNITS
TOOL POST and
HAND GRINDERS**

1307 Seventeenth Street, Racine Wisconsin

For more data circle 416 on Reader Service Card

Page

156

new
literature

**Use the Reader Service Cards opposite
pages 32 and 340 for requesting free
copies of the literature listed below.**

1. Diamond Tools

Abrasive Dressing Tool Co., 14530 Second Blvd., Detroit, Mich. Complete line of diamond tools.

2. Coolant

Aetna Manufacturing Co., Bensenville, Ill. "Refrigeration Applied to Metalworking by Mystic Mist."

3. Stainless Steel

Allegheny Ludlum Steel Co., Oliver Bldg., Pittsburgh 22, Pa. Stainless Steel Type 418 Special.

4. Air Cylinder

A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y. Double or single acting air cylinders.

5. Toolholder

Aloris Tool Co., Inc., 131-37 Sanford Ave., Flushing 55, N. Y. Quick change tool post and toolholders.

6. Stamping Press

Alpha Press and Machine, Inc., 9281 Freeland Ave., Detroit 28, Mich. Two point backgear and high-speed automatic production stamping press.

7. Cams and Tools

American Cam Co., Inc., Hartford 1, Conn. Complete line of cams and tools for automatic screw machines.

8. Tools

Armstrong Bros. Tool Co., 5228 W. Armstrong Ave., Chicago 30, Illinois. Wrenches, socket wrenches, drop forged clamps, toolholders, setup and hold-down tools.

9. Boring Machine

Atlas Press Co., Clausing Div., Kalamazoo, Mich. Hydra-cycle semi-automatic turning and boring machines.

10. Steel Drawers

Aurora Equipment Co., Equipto Div., 606 Prairie Ave., Aurora, Ill. Booklet describes all steel drawer units, from 2 to 144 drawers.

11. Drilling Unit

Avey Division, The Motch and Merryweather Machinery Co., Box 625, Cincinnati 1, Ohio. No. 4 Hydro-Way unit for rugged drilling, reaming, spotfacing boring, counterboring and so on.

12. Steel Pipe and Tubing

The Babcock and Wilcox Co., Tubular Products Div., Beaver Falls, Pa. Croloy 2½ steel pipe, tubing and welding fittings.

13. Filters

Barnes Drill Co., 860 Chestnut St., Rockford, Ill. Kleenall combination magnetic and fabric filters.

14. Machinery Mounts

Barry Controls, Inc., 783 Pleasant St., Watertown 72, Mass. Leveling machinery mounts to make production machinery mobile and to protect from damaging vibration.

15. Abrasive Stones

Behr-Manning Co., Dept. H, Troy, N. Y. Special shapes, types and sizes of abrasive stones in natural stones or made in electric furnaces.



Precision TAPPING OF THIN AND BRITTLE MATERIALS

Recent design change provides a simple homing device as a standard component of the

HAMILTON SUPER SENSITIVE, SMALL-HOLE PRECISION TAPPING MACHINE

and makes routine of such problem work as the tapping of precision holes in thin metal sheets or in brittle plastics. Even improves performance in the tapping of blind holes!

YOU

will want full information about this important development!

WE WILL FURNISH IT

FREE

ask for

BULLETIN No. 2463

ADDRESS

THE HAMILTON TOOL COMPANY
828 South Ninth Street
HAMILTON, OHIO



IT'S A

Hamilton Tool

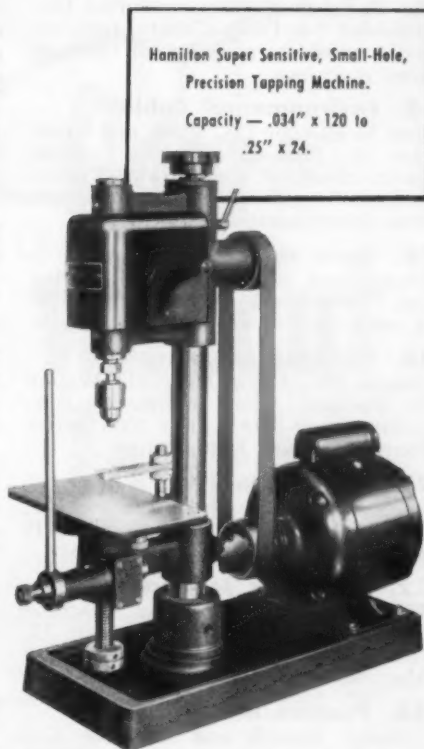
USE IT WITH CONFIDENCE

For more data circle 417 on Reader Service Card

2463

August, 1957

modern machine shop 157



Hamilton Super Sensitive, Small-Hole,
Precision Tapping Machine.

Capacity — .034" x 120 to
.25" x 24.

16. Tap

Beloit Tool Corp., Regal Div., Beloit, Wis. Unipass Tap—tandem style tap produces threads of from 10 to 30 included angle in a single pass without a lead screw.

17. Collets

The Benco Collet Manufacturing Co., Cleveland 14, Ohio. Collets, pushers, feed fingers and pads for all types of screw machines.

18. Environmental Cabinet

Blue M Electric Co., 138th and Chat-ham St., Blue Island, Ill. Testonic Environmental Cabinets with Power-O-Matic Control System and Constant-Flow Mechanical Refrigeration.

19. Tools and Gages

Brown and Sharpe Manufacturing Co., Providence 1, R. I. Complete line of precision tool and gage equipment.

20. Finishing Equipment

Casalbi Co., Globe Div., 540 Wayne St., Jackson, Mich. Information concerning Burr-Rite Senior 3000 Series Barrel Finishing Equipment.

21. Cup Packings

Chicago Rawhide Manufacturing Co., 1301 Elston Ave., Chicago 22, Ill. C/R Sirvis leather molded cup packings.

22. Automatic Bar Machine

The Cleveland Automatic Machine Co., 4940 Beech St., Cincinnati 12, Ohio. Single Spindle Automatic Bar Machine.

23. Positive Index Table

Colonial Broach and Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich. Information concerning design, operation and application of the positive-index table.

24. Spacing Collars

Dayton Rogers, Minneapolis 7D, Minn. Micrometer adjustable spacing collars for precision milling.

25. Router Bits

Detroit Tap and Tool Co., 8615 E. Eight Mile Rd., Baseline, Mich. Router bits for non-ferrous metals, plastics and other materials.

26. Positioner

Dixon Automatic Tool, Inc., 2300-23rd Ave., Rockford, Ill. Complete line of automatic parts handling and assembling equipment featuring the Dixon Auto-Positioner.

27. Power Saw

The DoAll Co., Des Plaines, Ill. Current data on model 24 vertical feed power sawing machine.

28. Welders

Eisler Engineering Co., Inc., 734 S. 13th St., Newark 3, N. J. Complete line of spot and butt welders for small parts—for wire, sheet metal, foil and tweezer welding.

29. Electrospark Machine

Ex-Cell-O Corp., Detroit 32, Mich. Information available on Style 243-6 Vertical Electrospark Machine and its operation.

30. Hot Work Die Steel

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. Data concerning three grades of hot work die steel.

31. Steel Tubing

Peter A. Frasse and Co., Inc., 17 Grand St., New York 13, N. Y. Data chart available on seamless carbon steel tubing.

32. Vertical Turret Lathe

Giddings and Lewis Machine Tool Co., Kaukauna Machine and Foundry Div., Kaukauna, Wis. Current data on the 32, 42 and 52 inch vertical turret lathes.

33. Pump

Graymills Corp., 3705 N. Lincoln Ave., Chicago 13, Ill. Complete line of centrifugal and gear type pumps and pumping units.

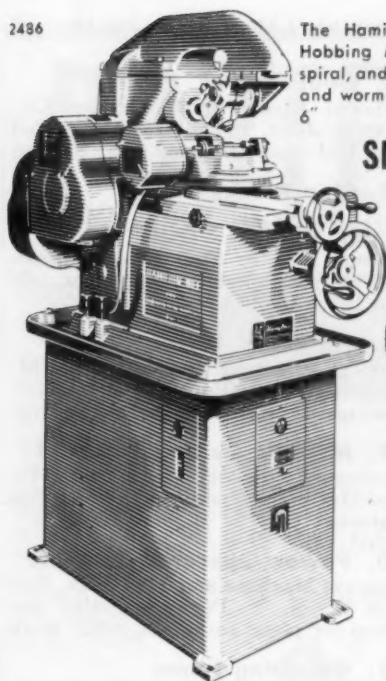
34. Metal Shearing Aids

The Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio. Information concerning slitters, squaring blades, alligator bar knives and so on.

35. Surface Treatment

E. F. Houghton and Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. "Surface Treatment of Metals."

2486



The Hamilton No. 1-B Precision, Small-Gear Hobbing Machine. Generates precision spur, spiral, and bevel gears, face gears, worm gears, and worms. Maximum diameter of work piece, 6"

SMALL PRECISION



Gears without tears

HERE'S WHY

The Hamilton Precision, Small-Gear Hobbing Machine, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle run out to less than .0002", work spindle and tailstock spindle alignment to less than .0002". *And this standard of workmanship is maintained throughout the machine.*

FURTHER

Speed, feed, and indexing each can be selected individually and independently. **THINK OF THE TIME TO BE SAVED BECAUSE OF THIS ONE FEATURE!!** And scores of additional features are described in our Gear Hobber Bulletin No. 2486 which we will be glad to furnish to you FREE.

ADDRESS

THE HAMILTON TOOL COMPANY
828 South Ninth Street
HAMILTON, OHIO



For more data circle 418 on Reader Service Card

new literature.. (Use reader service cards opposite pages 32 and 340 for free literature)

36. Furnaces and Ovens

K. H. Huppert Co., 6841 Cottage Grove Ave., Chicago 37, Ill. Heavy duty heat treating furnaces and ovens.

37. Centrifugal Pumps

Ingersoll-Rand, 11 Broadway, New York 4, N. Y. Two stage general purpose centrifugal pumps, Class GT.

38. Pusher Furnaces

Ipsen Industries, Inc., Rockford, Ill. Controlled atmosphere, multi-zone pusher furnaces for carburizing, carbonitriding and general heat treating applications up to 1,850 degrees F.

39. Boring Machine

Jones and Lamson Machine Co., Springfield, Vt. Single or double spindle precision boring machine.

40. Wheel Dressing

Koebel Diamond Tool Co., 9456 Grinnell, Detroit 13, Mich. Progress report on permanent form control of grinding wheels.

41. Die Head

Landis Machine Co., Waynesboro, Pa. The 5C Landmatic taper attachment die head.

42. Broaching Tools

The LaPointe Machine Tool Co., Hudson, Mass. "How to Care for Broaching Tools."

43. Welder

The Lincoln Electric Co., Dept. 3514, Cleveland 17, Ohio. Idealarc 300, 400 and 500 ampere combination AC and DC welders.

44. Arc Welding

Linde Air Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y. Development and application of Unionarc welding process in industry.

45. Cylinder

Logansport Machine Co., Inc., Logansport, Ind. Logansquare Cylinders for air or oil service.

46. Gear Shaver

National Broach and Machine Co., 5600 St. Jean, Detroit 13, Mich. Red Ring Universal Diagonal Gear Shaver.

47. Step Blocks

Karl A. Neise, Dept. MMS, 404 Fourth Ave., New York 16, N. Y. Mermod Master Step Blocks adjustable in increments of approximately 0.04 inch.

48. Hardness Tester

Newage Industries, Inc., 222 York Rd., Jenkintown, Pa. Portable metal hardness testers with direct dial readings.

49. Metallic Cutting Material

Newcomer Products, Inc., Latrobe, Pa. NewMet high velocity metallic cutting material.

50. Power Operated Machine

Niagara Machine and Tool Wks., Buffalo 11, N. Y. Power operated machine for plate and sheet metal work.

51. Clamping Items

Northwestern Tool and Engineering Co., 119 Hollier Ave., Dayton 3, Ohio. Step blocks, clamps and stud sets.

52. Surface Grinding Machine

Norton Co., Worcester 6, Mass. Complete data on the ABC of surface grinding.

53. Power Units

Oil-Dyne, Inc., 2115 W. Marquette Rd., Chicago 36, Ill. Pumps, cylinders, valves, pressure switches, accessories and so on.

54. Cutting Tools

The O. K. Tool Co., Inc., 80 Elm St., Milford, N. H. Boring heads, reamers, gang mills, end mills, forming tools and so on.

55. Turret Punch Press

O'Neil-Irwin Manufacturing Co., 306 Eighth Ave., Lake City, Minn. Di-Acro turret punch press with micro twin gages for instant gaging.

PORTELVATOR®

The Handy HAMILTON Portable, Elevating Table

A
PORTABLE
HEIGHT-
ADJUSTABLE
TABLE

• TRUCK
• WORK BENCH

for
DIE TRANSFER
• MACHINE FEEDING
• ASSEMBLY AT
BEST HEIGHT
IN BEST LIGHT

LIFTING
• LOWERING
• TRANSPORT
of
SHEETS
PLATES
BARS
TUBES
PIPES
TOOLS
DIES
FIXTURES

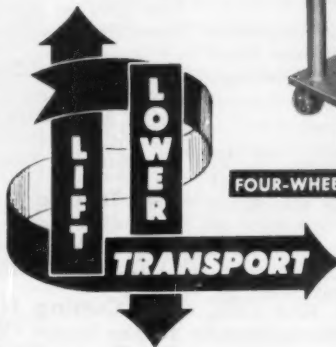
• ALL
COMPACT HEAVY
LOADS

**UNOBSTRUCTED
PERIMETER**

**WORK FROM
ANY SIDE**

**MORE SERVICE for LESS MONEY
than
ANY Other Unit of Equipment**

43 table surfaces
point support



FOUR-WHEEL and



SIX-WHEEL MODELS

Recent changes and additions to the line provide greater capacities, new flexibility, many bonus features.

Write for NEW, FREE Bulletin P-5604

Address THE HAMILTON TOOL COMPANY,
828 South Ninth Street, Hamilton, Ohio



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

5604

For more data circle 419 on Reader Service Card

new literature.. (Use reader service cards opposite pages 32 and 340 for free literature)

56. Grinder Turbine

Onsrud Machine Wks., Inc., 3941 Palmer St., Chicago 47, Ill. Current data on air turbine grinder with 75,000 r.p.m. at 1/6 h.p.

57. Type Holder

The Pannier Corp., Pannier Bldg., Pittsburgh 12, Pa. Information relative to Supreme holders with Roto-Pin type lock.

58. Carbide Tools and Dies

Pratt and Whitney Co., Inc., Jaquith Carbide Div., 25 Charter Oak Blvd., West Hartford 1, Conn. Complete line of carbide tools and dies.

59. Carbide Cutting Tools

Productive Tool Service, Inc., 27022 Knickerbocker Rd., Bay Village, Ohio. Complete line of high speed steel and carbide cutting tools.

60. Sealers

Raybestos-Manhattan, Inc., Adhesives Department, Bridgeport 2, Conn. Ray-Bond Adhesives, Protective Coatings and Sealers.

61. Public Relations

The Raymond Corp., Greene, N. Y. Informative public relations booklet concerning "You and The Raymond Corporation."

62. Carbide Tools

Rotary Tool Industries, Inc., 4461 W. Jefferson, Detroit 9, Mich. End mills, drills, reamers, burrs, countersinks and special cutting tools.

63. Toolholder

RoyEl Tools, 4221 Excelsior Blvd., Minneapolis 16, Minn. Toolholder is completely adjustable; no bushing, no collets, no extra jaws.

64. Power Press

Sales Service Machine Tool Co., Press-Rite Div., 2355 University Ave., St. Paul 14, Minn. Press-Rite power press has heavy semi-steel frame with specially designed reinforcement.

65. Column Instrument

The Sheffield Corp., Dept. 12, Dayton 1, Ohio. "Precisionaire" single and multiple column instruments, standard tooling, standard adjustable tooling and standard basic design tooling.

66. Grinding Fixture

F. E. Smith, Toolmaker, 840 S. Main St., Attleboro, Mass. Information available on adjustable Multi-Angle Grinding Fixture.

67. Toolroom Lathe

South Bend Lathe Wks., South Bend 22, Ind. Six bed lengths; 33 inches to 129 inches on engine lathes and three bed lengths; 33 inches to 57 inches on toolroom models.

68. Metal Fasteners

Standard Pressed Steel Co., Jenkintown, Pa. Tensile, shear and fatigue strength tests of titanium threaded fasteners at temperatures ranging from room temperature to 600 deg. F.

69. Electric Clutch

Sterns Electric Corp., 120 N. Broadway, Milwaukee 2, Wis. Model GS electric clutch for all types of power transmission control.

70. Testing Machine

Steel City Testing Machine, Inc., 8817 Lyndon Ave., Detroit 38, Mich. Model D Ductility Testing Machine.

71. Cutting Fluid

D. A. Stuart Oil Co., 2729 S. Troy St., Chicago 23, Ill. Solvol liquid cutting compounds.

72. Testing Fixtures

P. A. Sturtevant Co., Addison, Ill. Information concerning torque testing fixtures.

73. Coolant Separator

Sundstrand Magnetic Products Co. Division, Sundstrand Machine Tool Co., 1020 9th St., Rockford, Ill. Magnetic coolant separator for grinding, honing and gear shaving machines.

For more data circle 419 on Reader Service Card

August, 1957

modern machine shop 161

**they're both
two
diameter drills....**

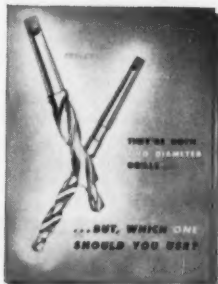
BUT WHICH ONE SHOULD YOU USE?

**A Mohawk SUBLAND
..... NATURALLY!!**

Mohawk Sublands are the modern, practical answer to faster, more accurate and economical drilling of multiple diameter cavities.

One Mohawk Subland drill will outwork and outperform two, three, four or more ordinary step type drills... and do the job better.

Why? Because Mohawk Sublands last longer, stay accurate through multiple regrinds and reduce hole costs. They quickly pay for themselves in man hours, equipment and tool dollar savings. And... they're available in an amazing range of "off the shelf" size-optional sizes and types.



Facts For Free!

Write, wire or 'phone today for your free copy of the big illustrated brochure Sublands vs Step tool operations. It's yours for the asking... and if you're interested in combination drilling operations, you'll find dozens of ways to save your equipment dollars.

**NORMAL DELIVERY ON MOHAWK
SIZE-OPTIONAL SUBLANDS
TEN DAYS FROM RECEIPT OF ORDER!**

world's largest producers of Sublands



MONTPELIER, OHIO

For more data circle 420 on Reader Service Card

August, 1957

modern machine shop 163

new literature.. (Use reader service cards opposite pages 32 and 340 for free literature)

74. Die Sets

Superior Steel Products Corp., 2754 S. 19th St., Milwaukee, Wis. Precision, all steel die sets and supplies.

75. Special Tools

Sutton Tool Co., Dept. MMS-3, Sturgis, Mich. Complete line of special tools and workholding devices.

76. Grinding Wheel Dresser

Threadwell Tap and Die Co., Greenfield, Mass. Current data on the Tangi-Matic Dresser.

77. Conversion Data

Torsion Balance Co., Clifton, N. J. Chart containing conversion data for Rockwell tests, scales and tables for cylindrical corrections.

78. Test Indicator

Transocean Trading Co., 6453 Santa Monica Blvd., Los Angeles, Calif. The Verdict "Supertest" 0.0005 inch test indicator.

79. Milling Machine

Triplex Machine Tool Corp., 75 West St., New York, N. Y. Jigboring and high precision vertical toolroom milling machines.

80. Machine Tool Controls

True Trace Sales Corp., El Monte 7, Calif. 1, 2 and 3 slide control hydraulic tracers and numerical controls.

81. Special Machines

Tuscan Corp., 16030 W. McNichols, Detroit 35, Mich. Electronics, automation, special machines, product engineering and test equipment.

82. Processing Equipment

Universal Gear and Machine Co., 1301 E. McNichols Rd., Detroit 3, Mich. Roll feeders straighteners, reel stands, coil cradles and so on.

83. Coolants

Van Straaten Chemical Co., 630 W. Washington St., Chicago 6, Ill. How to select tool lubricants and grinding coolants.

84. Brazing Rings

Wall Colmonoy Corp., Stainless Processing Division, 19345 John R., Detroit 3, Mich. Microbraz brazing rings from stainless and high alloy steel tube assembly work.

85. Cut-Machining Units

Wallace Supplies Manufacturing Co., 1304 Diversey Parkway, Chicago 14, Ill. Current data on "Wallace Cut-Machining Units."

86. Toolholder

Warner Development Co., South Beloit, Ill. "Spee-D-Thred"—toolholder for cutting threads.

87. Horizontal Redraw Press

The Waterbury Farrel Foundry and Machine Co., Waterbury, Conn. Horizontal, automatic redraw press.

88. Height Gage

Webber Gage Co., 12899 Triskett Rd., Cleveland 11, Ohio. Micro-Accurate Optical Height Gage.

89. Grinder

Wesson Co., Dept. AD, 1220 Woodward Heights Blvd., Detroit 20, Mich. Poweramic Carbide Tool Grinder 56B.

90. Fixture Clamp

West Point Manufacturing Co., 26935 West Seven Mile Rd., Detroit, 19, Mich. Wespo fixture clamps.

91. Cutting Unit

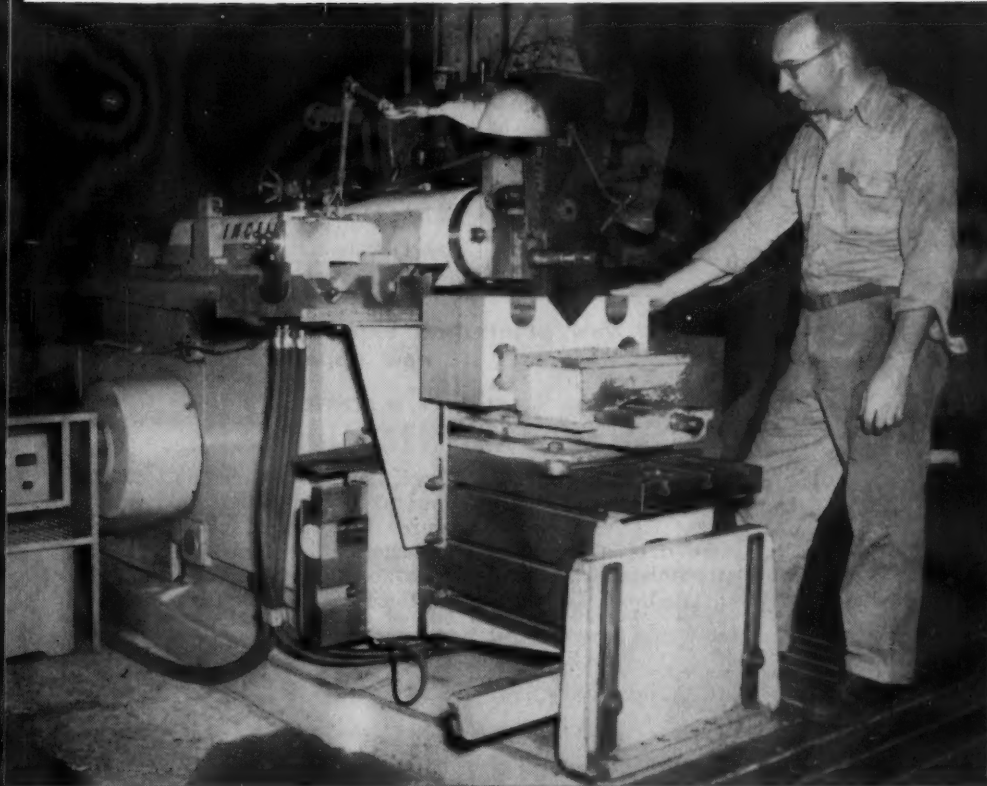
S. S. White Industrial Div., 70 E. 40th St., New York 16, N. Y. The Industrial Airbrasive Cutting Unit, Model C.

92. Turret Punch Press

Wiedemann Machine Co., 542 Wissahickton Ave., Philadelphia 32, Pa. Turret punch press pierces work to close tolerances at high speed without layout or setup.

93. Rail Tractor

Yale and Towne Mfg. Co., Philadelphia, Pa. Rail King Tractor for use with monorail hand and electric hoists up to three tons capacity.



Photograph courtesy of Heppenstall Company, Pittsburgh 1, Pa.

High-alloy shear knives machined on accurate Cincinnati Rigid Shaper...

at HEPPENSTALL COMPANY, Pittsburgh 1, Pa.

This Cincinnati 36" Rigid Shaper, equipped with an automatic contouring unit, is machining high-alloy steel shear knives. These knives will be used to cut 3" round-cornered squared billets and 2½" rounds, by a leading Midwestern drop-forge company.

The heavily ribbed column, extended ram bearing and slot-free ram insure minimum deflection and maximum accuracy. Exclusive Cincinnati 50 psi pressure lubrication is real

insurance against wear. The Cincinnati electro-magnetic brake and clutch with finger tip control is positive and trouble free. Faster on the job... Easier on the operator.



Write Department G for Bulletin "Cincinnati Rigid Shapers". We also suggest you consult our Application Engineering Department regarding your machining problems.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS - SHEARS - PRESS BRAKES



Page

166

news
of the
industry

news of the industry

**New plants and expansions . . .
mergers . . . new appointments.**

Edited by R. M. SCHIFFER

FOSDICK ANNOUNCES TAPE CONTROLLED JIG BORER

With the addition of a perforated tape control mechanism to the Fosmatic Jig Borer, The Fosdick Machine

Tool Company, Cincinnati 23, Ohio, has taken a gigantic step forward toward the eventual goal of complete automation in jig boring operations. The accompanying illustration shows in the foreground the compact equip-



(Left to Right) Fosdick Machine Tool Company personnel Hoy Harry, service engineer (with back to camera); Clark Hibard, sales manager; Robert Knosp, design engineer;

Carl Linden, president; and Daniel Murphy, sales engineer, Delaware Valley Machinery, Incorporated; Nevin H. Furley, master mechanic, Chambersburg Engineering Company.

ment which converts the data punched in the tape to impulses which direct the sequence of desired operations.

On display last month in the company's plant for a showing to the press, the Fosmatic tape controlled jig borer demonstrated the amazing ease and accuracy of controlling, by tape alone, the positioning of the table and saddle, as well as the feeds and speeds of the spindle. The advanced design of the new Fosmatic with tape control makes possible the ability of the machine to take over important functions formerly dependent upon operator's skill and judgment.

★ ★ ★

NIAGARA OPENS DISTRICT OFFICE

Niagara Machine and Tool Works, Buffalo, N. Y., recently announced the opening of a new Boston District Office located at 500 Main St., Waltham, Mass. Robert F. Gaylord has been appointed manager. The new office will be devoted exclusively to the sales-engineering of Niagara presses, press brakes, shears, related machines and

tools for sheet and plate metalworking. Mr. Gaylord comes to Boston from Niagara's Central Sales Office in Buffalo, New York. He has had experience in handling widely diversified customer requirements and technical problems. A graduate of the U. S. Naval Academy, with a Bachelor of Science Degree in Engineering, he later served for a period of four years in the United States Air Force.

ONLY NEW HALLOWELL ERECTOMATIC STEEL SHELVING

has the unique built-in locking device which cuts assembly time, speeds repositioning of shelves



PLUS THESE FEATURES

Straight-in, straight-out shelf change
Independent shelf positioning
Full use of shelf area
Common side panels and posts
Beaded posts and flanged shelves
Full-depth shelf supports
4 classes of shelves

The unique built-in locking device,* developed by SPS for its new ERECTOMATIC® steel shelving, speeds assembly and rearrangement of shelves. To position a shelf—just slide it into place, press the locks, and the shelf is locked. To reposition a shelf—release the locks, pull the shelf straight out, slide it straight in at its new location, and press the locks. It takes only seconds to do the complete job. And shelves below and above, to left or right are undisturbed. For complete information, see your local Hollowell distributor. Or write Hollowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pennsylvania.

*Patent applied for

STANDARD PRESSED STEEL CO.



SHOP EQUIPMENT DIVISION



For more data circle 422 on Reader Service Card



**WRITE
BEFORE
NEXT
TUESDAY**

The cylinder of "distinction" shown above is a Factory Reject. Only straight rods available.

47-page catalog illustrating complete line of

ALLEN AIR

**AIR CYLINDERS
AIR VALVES & CLAMPS
DIAL FEED TABLES**

THE A. K. ALLEN CO.		MS-8
57 Meserole Ave., Brooklyn 22, N. Y.		
Name		
Company		
Address		
City	Zone	State

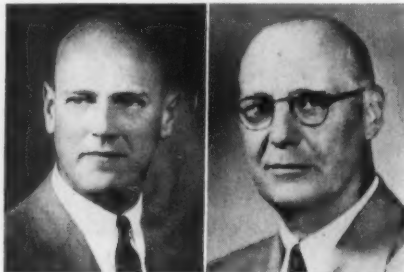
For more data circle 423 on Reader Service Card

news of the industry . . .

BULLARD ELECTS OFFICERS

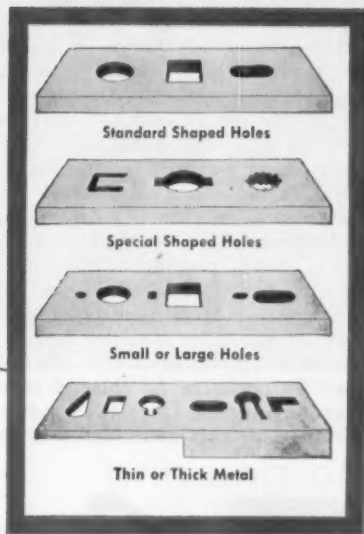
Directors of The Bullard Co., Bridgeport, Conn., recently announced the election of E. C. Bullard, as chairman of the board and chief executive officer, and E. P. Bullard III, as president and general manager. E. C. Bullard has been a director of the company since 1930 and has been president and general manager since 1946. He was first employed by the company in 1917 after graduating from the Sheffield Scientific School of Yale University. He served a year and a half in the armed forces during World War I and, since 1919, has been continuously with Bullard, becoming vice president and general manager in 1931. He is also a director of the Connecticut National Bank of Bridgeport, Southern New England Telephone Company, New Haven, Connecticut, and other New England industries. He is also a member of the executive board of the Manufacturers' Association of Bridgeport and the Bridgeport Chamber of Commerce.

The company's new president, E. P. Bullard III, is a grandson of Edward Payson Bullard, who founded the company in 1880; and the son of E. P. Bullard, Jr., second president of Bul-



E. P. Bullard, III (left); E. C. Bullard, The Bullard Company, Bridgeport, Connecticut

WHEN R-B Punches Are Used



What are your piercing or forming requirements—standard or unusual shapes—small or large holes—steel or special alloys—thin or thick metals? Many hole-making applications, formerly requiring drilling or some other costly means, can now be done with R-B interchangeable punches. If you have thought your piercing jobs too tough for interchangeable punches, it will pay you to investigate the wide application potential of R-B standardized equipment.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff for:

- ★ Cutting Your Production Costs
- ★ Reducing Die Designing Time
- ★ Increasing Productivity of Presses
- ★ Supplying Answers to Piercing Problems
- ★ Saving Die Construction Time
- ★ Complete Standardization of Press Tooling



For Additional Information or Engineering Service, Write to:

RICHARD BROTHERS PUNCH DIVISION
ALLIED PRODUCTS CORPORATION

DEPT. 36

25000 CANTON AVENUE

DETROIT 26, MICHIGAN

For more data circle 424 on Reader Service Card

news of the industry . . .

lard from 1907 to 1946. He has served the company from 1933 to 1951 in the capacities of assistant chief engineer, vice president in charge of manufacturing and vice president and assistant general manager. He is responsible for the design of many Bullard machine tool developments, such as the Cutmaster Vertical Turret Lathe, the Man-Au-Trol Vertical Turret Lathe and Spacer and two improved types of Bullard Multi-Au-Matic Machines. He is the holder of 39 machine tool patents. Since 1951, while continuing to serve as a Bullard director, he has been an executive of Pratt and Whitney Aircraft Division of United Aircraft Corporation. As chief of production engineering for all Pratt and Whitney aircraft manufacturing, he is

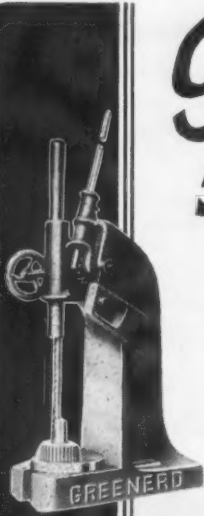
responsible for manufacturing methods, tooling and machines required for the production of piston engines, and the J-57 and J-75 jet engines. He graduated from Yale University and attended Harvard Business School.

★ ★ ★

GISHOLT DONATES LATHE TO SMITHSONIAN INSTITUTE

Gisholt Machine Co., Madison, Wis., recently announced the donation of the Model 1889 Turret Lathe, one of the first manufactured by the company, to the Smithsonian Institute, Washington, D. C. It will become a part of a permanent exhibit in the new Hall of Tools, at the United States National Museum Division of the Smithsonian. As a member of the National Machine Tool Builders

★ ★ ★ ★ ★



Greenerd

PRESSES

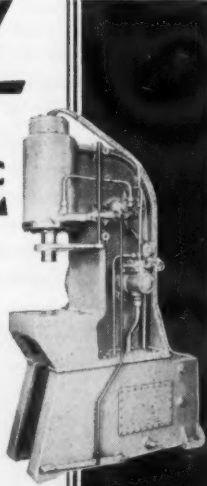
ARBOR & HYDRAULIC

for . . .

- ASSEMBLING
- BROACHING
- FORMING
- STRAIGHTENING

Rack and Pinion Arbor Presses.
Hydraulic presses made to conform to I.I.C. standards. Pictured at right is 15-ton hydraulic press.

LISTED IN SWEET'S MACHINE TOOL CAT.
OR WRITE TODAY FOR CATALOG #554.

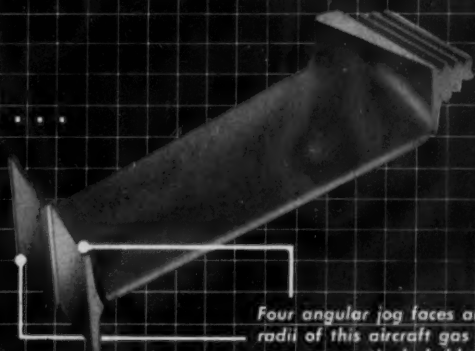


Greenerd ARBOR PRESS CO.

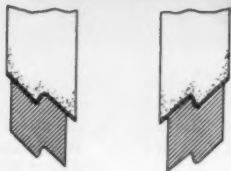
41 CROWN ST. NASHUA, N.H.

For more data circle 425 on Reader Service Card

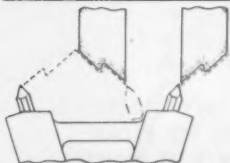
hoglund contour dressing ...



Four angular jog faces and four radii of this aircraft gas turbine vane are routinely held to tolerances of $\pm .0002$ ".



Two turbine vanes are simultaneously profiled on double wheel grinder. Parts are rotated to grind other side.



One pass automatic dressing employs double diamond fixture. Diamond "A" dresses right wheel; "B" dresses left wheel. Both have uniform peripheral speed.



Dresser features 10:1 inclined plane reduction, with ball slides assures repetitive accuracy and trouble-free dressing.

enables "tenth tolerance" grinding of turbine vane faces

GRINDING PROFILES NEVER BEFORE POSSIBLE . . . are now produced by standard grinding procedures in the aircraft, automotive and business machine fields. Production grinding of parts such as these results from the application of Hoglund Contour Wheel Dressers.

Through automaticity and ingenious inclined planes contour reduction, Hoglund Dressers initiate the accuracy necessary to any contour grinding job. Hydraulically operated, tied into the grinding cycle, they feature quick-change contour templates for multiple use.

Hoglund Dressers have been applied to every type of grinder.

The whole story on their advantages to production or short-run grinding is yours for the asking.

HOGLUND

ENGINEERING & MANUFACTURING CO., INC.
343 Snyder Avenue • Berkeley Hts., N. J.

Name _____ Title _____

Co. _____

Address _____

City _____ Zone _____ State _____

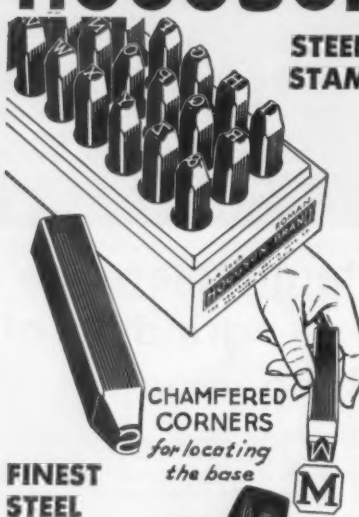
Send for brochure
on solutions to
tough profil-
ing problems.

For more data circle 426 on Reader Service Card

**TO BE SURE OF
QUALITY
Remember
the Name**

HOGGSON

**STEEL
STAMPS**



**CHAMFERED
CORNERS**
*for locating
the base*

**FINEST
STEEL**

*long
life*

**ALSO IN
REVERSE
FOR
MOLDS
& DIES**

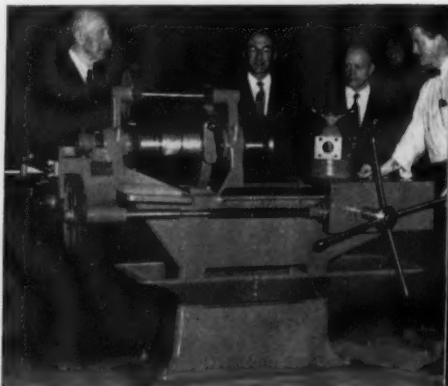
Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.

New Haven 7, Connecticut

For more data circle 427 on Reader Service Card

news of the industry . . .



(Left to right) G. E. Gernon, secy., George M. Class, v.p., Alfred G. Hoffer, wks. mgr., and R. F. Johnson, assistant to president, Gisholt Machine Co., Madison, Wisconsin

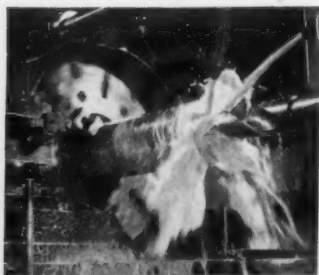
Assoc., Gisholt was one of many firms contacted for aid and assistance in building this display. Over 2,000,000 visitors a year will soon be able to view this exhibit.

★ ★ ★

CROSS COMPANY LICENSES SEVERAL FIRMS TO BUILD MACHINE CONTROL UNITS

The Cross Co., Detroit, Mich., recently announced the licensing of three firms to build the Cross Machine Control Unit, which is said to be the first step in automatic tool programming. The firms that received licenses were Scully-Jones & Co., Chicago; Seibert & Sons, Inc., Chenoa, Ill.; and Royal Design & Manufacturing, Inc., Detroit, Michigan.

The Cross Machine Control Unit, originated and patented by Ralph E. Cross seven years ago, has been installed on more than 1,000 machines



CUTTING



GRINDING



ROLLING



WASHING

HOW SUNOCO EMULSIFYING OILS HELP YOU CUT COSTS

*The S.E.C.O. series will
meet all your emulsifying
oil needs*

REGULAR • Sunoco® Emulsifying Cutting Oil (S.E.C.O.) is a low-cost general-purpose oil for most cutting and grinding applications. Operators like S.E.C.O.—it makes clean emulsions that stand the gaff of long production runs. Its superior rustproofing ability protects both machines and work.

HEAVY-DUTY • S.E.C.O. HD emulsions have film strengths more than twice those of regular emulsifying oils. This extra strength, plus high oiliness, gives you a low-cost way to machine today's tough alloys and "hot" jobs.

SPECIAL • Custom grades of Sunoco Emulsifying Cutting Oil are made to meet unusual hard-water conditions. Other special formulations are used in rolling steel, brass, aluminum . . . in hot and cold washing . . . in rustproofing . . . and in many other applications.

FOR FULL INFORMATION: Call your Sun representative or write for Technical Bulletin 16 (S.E.C.O.) and Technical Bulletin 11 (S.E.C.O. HD). Write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM—8.

**Industry uses more Sunoco Emulsifying
Oil than any other emulsifying oil.**



**INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY** PHILA. 3, PA.

In Canada: Sun Oil Company Limited, Toronto and Montreal

© SUN OIL CO., 1957

For more data circle 428 on Reader Service Card

"DO IT YOURSELF" Saves Hours, Cuts Costs



HEAT TREAT SMALL PARTS, TOOLS, DIES, ETC. IN YOUR OWN SHOP WITH A VERSATILE, HIGHLY EFFICIENT TEMCO ELECTRIC FURNACE.

Why tie up your big equipment on small heat treat jobs below its capacity, or why "farm out" heat treating of parts, tools, dies? Put a TEMCO bench-type electric furnace in your shop and see how it pays for itself over and over again—in time-savings, cost savings, and production conveniences. Shown above is Type 1700 furnace with Type 400A control cabinet featuring the fully automatic Amplitrol controller in this convenient mounting.

Temco Furnaces are economical to own and operate . . . easy to hook up . . . easy to use. Eight models with chamber sizes from 4" x 3 3/4" x 3 3/4" to 9 1/2" x 8 1/2" x 18". \$65 to \$607.50 complete with controls. Write for data and nearest dealer's name.



ELECTRIC FURNACES
Thermo Electric Manufacturing Co.
488 Huff St., Dubuque, Iowa

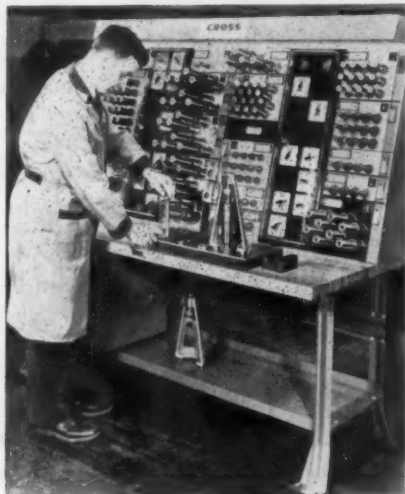
For more data circle 429 on Reader Service Card

news of the industry . . .

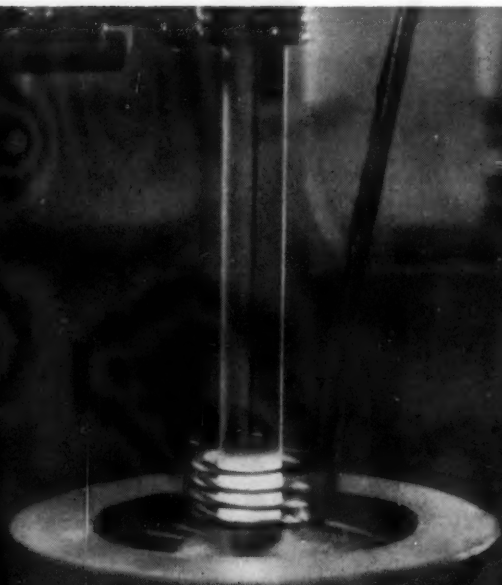
of a great many different makes and types.

The unit is said to increase machine tool efficiency and reduce machine downtime for tool changes. A major component of the unit is the Cross Toolometer which automatically stops the machine when a tool becomes dull. The operator then checks the Toolometers on the master control board to see what other tools are almost ready for replacing. By changing all of these tools during the same shut-down period, downtime is said to be minimized considerably.

The Cross Toolometer, in effect, schedules tool changes, provides a visual pattern of how long each tool has been in operation and indicates when it must be changed. Standard gages are provided to preset the tools to exact requirements while the machine is working, so that no time is lost in adjustments or trial cuts during replace-



Cross Machine Control Unit and Toolometers



Ketos shaft being induction hardened to Rockwell 55-56, while ends remain soft for final machining.
Photographed at Control Instrument Co., Inc., Brooklyn, N. Y.

KETOS has wide hardening range with minimum volume change...

Ketos is a low priced alloy tool steel that can be hardened from low temperatures with practically no volume change. It has deep hardening qualities, and a fine grained structure, that make it desirable for many production parts.

That's why nondeforming Ketos is well suited not only for most tool steel applications such as gauges, dies, and taps but also for close-tolerance, wear-resistant parts like the actuator bar shown in the induction heat-

ing unit above. The thin contact edges of this particular part withstood a "life test" of over 4-million high speed blows. No other steel tested lasted more than 1-million cycles before it chipped and failed.

If Ketos sounds like the steel you should be using, call your nearby Crucible warehouse. Stocks of Ketos and dozens of other special tool steels are large, delivery fast. *Crucible Steel Company of America, Chamber of Commerce Bldg., 7th Ave. and Smithfield St., Pittsburgh 30, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

For more data circle 430 on Reader Service Card

news of the industry . . .

ment. Two sets of these preset tools are stored in the unit for immediate use when needed. Tool breakage and grinding costs are reduced because the machine is shut down when tools need changing. This reduces scrap because the tools do not "lose size" and the machine does not become overloaded and damaged by dull cutting tools.

**NORTON COMPANY WILL BUILD
\$6.5 MILLION PLANT FOR
GRINDING WHEEL MANUFACTURE**

Announcement was recently made that a new \$6.5 million plant for the manufacture of grinding wheels will be built by Norton Co., Worcester, Mass. When completed in mid-1959, the five acre plant will contain modern facilities for making organic bonded grinding wheels. This plant, to be

known as plant 8, has been designed for straight line production of grinding wheels up to 30 inches in diameter.

Preparation of the site is already in progress and work on the foundations will begin soon. The plant will be located parallel to plant 7. The new plant, somewhat larger than plant 7, will include many similar production features. In both plants, materials will be received at the North end. Wheels in process will flow southward via various conveyor systems which eliminate manual handling between setups of manufacturing. Finished stock will be stored and shipped from the South end of both plants.

The building will be 320 feet



HOLD IT!
**FIRMLY
BUT GENTLY**

**WITH
WOODWORTH CHUCKING EQUIPMENT**

Our tough looking character who is holding the little bird clearly demonstrates one fact: whenever you are holding *anything* it should be secured with gentle firmness. And this is so true when considering chucking equipment.

Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.

We invite your inspection and consideration of N. A. Woodworth products. There is a Woodworth Sales Representative in your area and a letter to the N. A. Woodworth Company will place him promptly at your service.

WOODWORTH
1300 EAST NINE MILE ROAD
DETROIT 20, MICHIGAN

For more data circle 431 on Reader Service Card

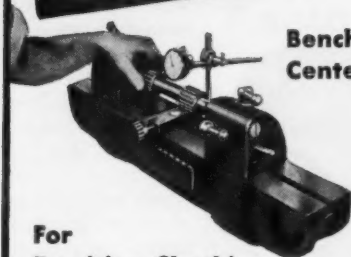
Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.
For more data circle 430 on Reader Service Card

Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.

Bench Centers



For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

COMPLETE RANGE AS FOLLOWS:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

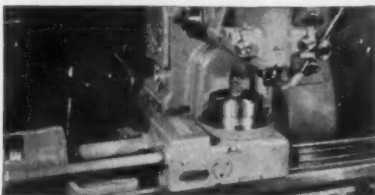
Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 582.



SUNDSTRAND MACHINE TOOL CO.

2539 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

For more data circle 432 on Reader Service Card

For more data circle 431 on Reader Service Card

176 modern machine shop

August, 1957

news of the industry . . .

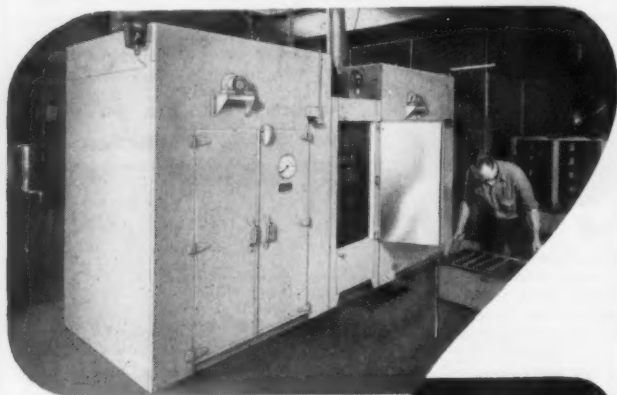
wide and 620 feet long. The sides will be of prefabricated, insulated aluminum panels designed for a minimum of maintenance. Windows will also be of aluminum construction. Brick facing will be used on the front of the building along D Street. All offices, locker rooms and service departments will be

located on this side of the plant. The steel-decked, flat roof will be covered with tar and gravel.

A high level of illumination will be provided throughout the plant. The designed lighting level in the plant is 40 foot candles in the office area. The office area will be completely air conditioned. Part of the manufacturing area will also be air conditioned because of the need for closely controlled

temperature and humidity conditions to insure high quality in certain steps of the wheel making process. The remainder of the plant will be provided with ventilating equipment which will insure summer and winter comfort for all. The plant will also be "color conditioned" according to the latest recommendations of color experts in order to provide for both safe and pleasant working conditions.

A covered walkway will connect plant 8 and plant 7 to provide a sheltered access route to the plant 7 cafeteria which will service both plants. Adequate parking facilities will be conveniently located adjacent to the plant at both ends.



Bake varnishes safely

**with
DESPATCH
OVENS**

Portable Electric Tools, Inc.,

Chicago, uses six Despatch V-39 ovens and three Despatch RS-1 ovens to bake thousands of electric motor armatures and field coils every day.

The highly volatile gases released by varnishes baking at near 300° temperatures are carried off by the Despatch-designed exhaust system.

The forced exhaust is electrically timed to assure adequate ventilation at peak vapor periods—gravity exhaust carries on in the later stages of baking. Dual thermostatic systems guarantee accurate heat control.

Portable Electric Tools found that the racks designed for the truck loaded V-39 ovens could be conveniently used in the Batch type RS-1 oven—this fact, plus the high efficiency of the units resulted in a 50% production increase after installing the Despatch system.



Send for Bulletin 100

DESPATCH
Established 1902
OVEN
CO.

DESPATCH OVEN COMPANY
381 Despatch Bldg. • Minneapolis 14, Minn.

For more data circle 433 on Reader Service Card

**Buy blocks
with a
"Built-in"
Wear
Factor!**



**ELLSTROM CHROMIUM PLATED GAGE BLOCKS
are guaranteed "minus nothing" from nominal size!**

Here at last are gage blocks with a positive "built-in" wear factor! The only blocks ever produced and priced as standard with dimensional accuracy unconditionally guaranteed to be within specified millionths on the "plus" side of nominal block size and minus "zero" . . . absolutely nothing . . . undersize!

This complete elimination of the conventional minus tolerance gives you, the gage block user, three new and exclusive benefits. First, it provides positive assurance against receiving new blocks

that are actually "worn" undersize during manufacture before they are ever used. Second, it gives you finer, more practical accuracy . . . with the sure knowledge that every Ellstrom block you buy will start wearing toward its nominal size rather than away from it. And third, it gives you a guaranteed minimum wear factor equivalent in millionths to the full minus tolerance specified as standard for all other makes of blocks!

Write for descriptive literature containing complete price information today!

ELLSTROM
STANDARDS
DIVISION



DEARBORN GAGE COMPANY

"Measuring in Millionths for Three Generations"
22038 Beech Street • Dearborn, Michigan

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

For more data circle 434 on Reader Service Card

news of the industry . . .

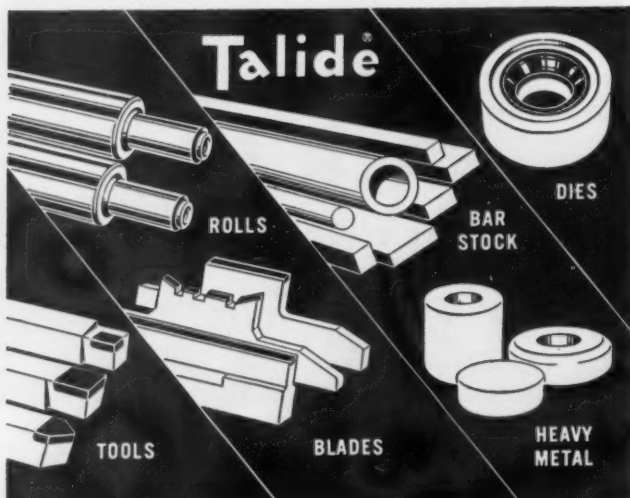
ACE DRILL BUSHING ANNOUNCES INTERNATIONAL DIVISION

Ace Drill Bushing Co., Inc., Los Angeles, Calif., recently announced the further diversification of its far-flung operations at a banquet, attended by 116 key Ace executives and other

guests. Alan A. Fisher, president of the company, unveiled plans for the expansion into foreign trade by the building of a large complete plant for the manufacture of drill bushings and other related industrial equipment near Sao Paulo, Brazil. It is said that the new plant will rank Ace first in the American industry to produce drill jig bushings for foreign consumption. It will furnish precision drill guides for the accelerated automobiles, aero-

nautical and other manufacturing industries for South America.

The operation of the new plant will follow labor patterns established in most of the plants embodied in the Ace family of companies. A firm advocate of Christianity applied to business as well as of assisting aspiring students to receive a college education by providing them with sufficient work to defray expenses, many of the



HARDEST MAN-MADE METAL!

• New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G. METAL CARBIDES CORP., Youngstown 12, Ohio.

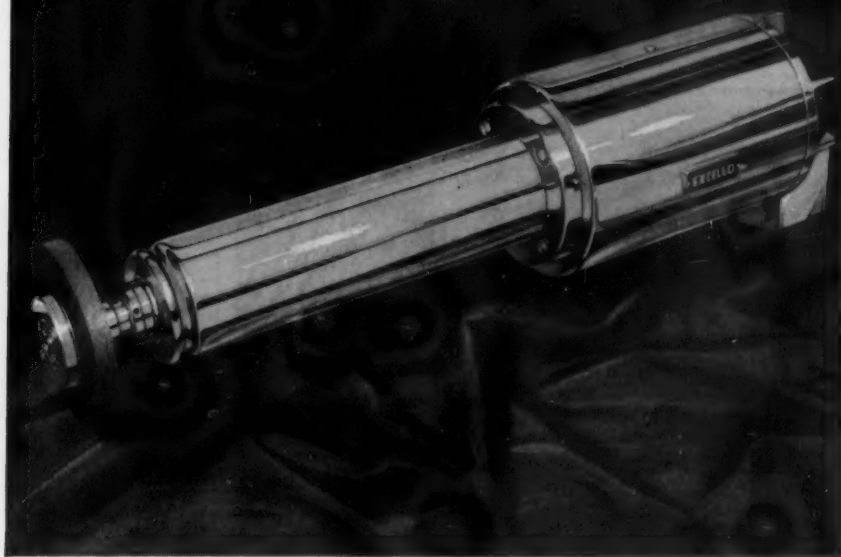


For more data circle 435 on Reader Service Card



Alan A. Fisher, pres.,
Ace Drill Bushing Co.

100,000



57-57

Proof of Precision: This 100,000th Spindle

... that's right. Ex-Cell-O has produced more than 100,000 precision grinding and boring spindles. They are in use today throughout the world, on a wide variety of important jobs. No other spindle manufacturer has so solid a record for satisfaction—so sound a reputation for building the best.

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

EX-CELL-O FOR PRECISION



Machinery Division

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS •
RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

For more data circle 436 on Reader Service Card

August, 1957

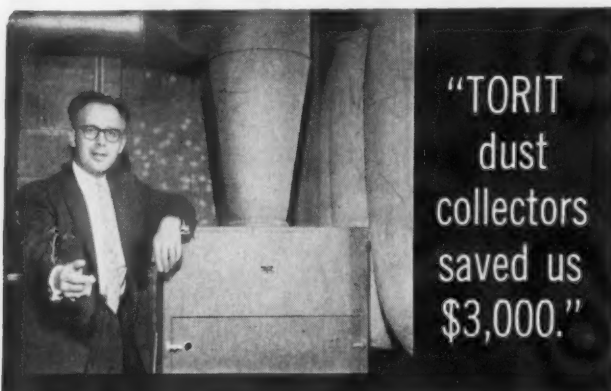
modern machine shop 181

eleven corporations headed by this industrialist are strategically located near colleges or universities. Students who need financial assistance are carefully chosen, given on-the-job training at company expense, and then permanently employed at standard wage scales on regular work schedules for a

maximum of 4 hours per day during the course of their education. Some have remained with the company following graduation, but many others today are practicing doctors, lawyers, ministers and scientists.

The banquet was ably m.c'd by George Beck, vice president. Speakers included: Dr. Norval F. Pease, president of La Sierra College; Del Herrick, president of Atlas Uranium Corp., a Colorado affiliate of Ace;

Frank Fleming, president of the Industrial Department, Hollywood Chamber of Commerce; George T. Smith, president of Brandon Manufacturing Corp., another Ace associated company; and Rev. Lee Price, who stated his theology training was possible because of the Ace student assistance program. Don Cox, special assistant to Mr. Fisher on the Brazil development, told of the special work that has been done in breaking down trade barriers and in obtaining industrial support for this project. Mrs. Martha Fisher, executive of West Coast Aero Tool Co., Inc., presented color pictures showing location



FREE BOOKLET shows you how to trap harmful dust better at less cost with TORIT.

Your plant can have the same initial savings and cost-cutting operation now enjoyed by the Sico Manufacturing Company, national producers of tables and seating equipment. Sico President, Kermit H. Wilson states, "... the lowest bid we had for a central dust collection system of minimum capacity was just under \$4,000. Our \$900 Torit installation has completely solved our dust problem and gives us greater flexibility than would be possible with a central system." There's a TORIT Collector to meet every type of dust problem, why not investigate?

FREE facts on TORIT DUST COLLECTORS that reduce maintenance costs, up production, improve employee morale. Write today to:

TORIT MANUFACTURING CO.
296 Walnut Street, St. Paul 2, Minn., Dept. 702

For more data circle 437 on Reader Service Card

A wheel for every job . . .

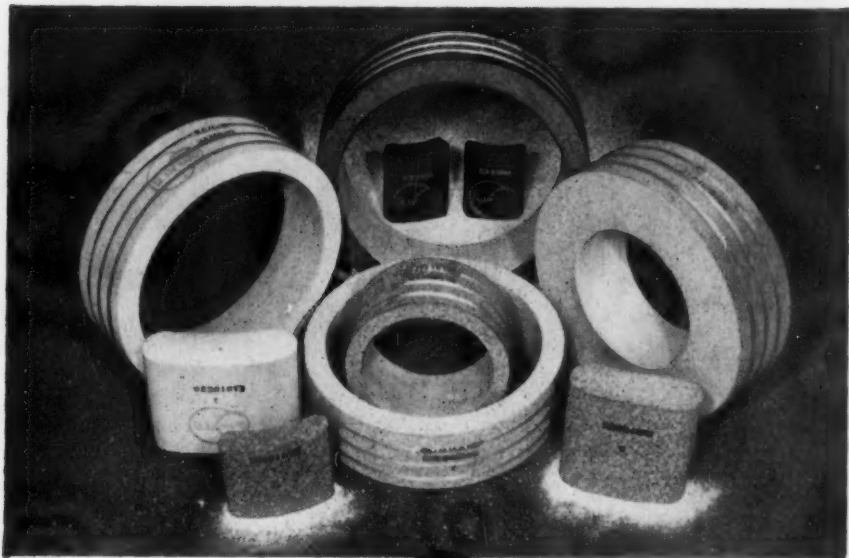
For every surface grinding job . . . whether tough as copper or fragile as glass . . . there's a Blanchard wheel that's best.

Blanchard grinding wheels, for use on Blanchard Surface Grinders, are made in cylinder, segment and sectored types. By selecting from a variety of vitrified, resinoid and silicate bonds and a number of different abrasives, Blanchard is able to make exactly the right wheel for every surface grinding job.

Precision duplication in the manufacture of every Blanchard grinding wheel assures you of identical results on all materials—regardless of finish or stock removal required.

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



PUT IT ON THE **BLANCHARD**

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass.

Gentlemen: Please send me free copies of "Blanchard Abrasive Wheels and Segments" and "The Art of Blanchard Surface Grinding" (3rd edition)

NAME _____ STREET _____
FIRM _____ CITY _____ ZONE _____ STATE _____

For more data circle 438 on Reader Service Card

August, 1957

modern machine shop 183

news of the industry . . .

of the Sao Paulo plant, as well as other industrial areas in South America being considered for further expansion.

★ ★ ★

NATCO CREATES NEW DIVISION

National Automatic Tool Co., Inc.,
Richmond, Ind., manufacturers of

multiple-spindle drilling and tapping machines and automation transfer machines, recently announced the formation of a Plastics Machinery Division, which will produce plastics injection molding machines. Heading the Plastics Division are Russell W. Powell, sales manager, and Richard M. Norman, chief engineer. Both of these men have had many years of experience in the field of plastic molding machinery and allied equipment.

★ ★ ★

A.W.S. NAMES F. L. PLUMMER SECRETARY

The American Welding Society, New York 18, N. Y., recently announced the appointment of Fred L. Plummer, Warren, Pa., as national secretary. He will assume his new duties immediately and will maintain his office at the Society's National Headquarters in this city. The ap-

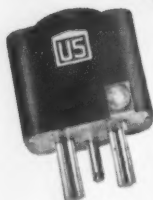


Fred L. Plummer, Secy.

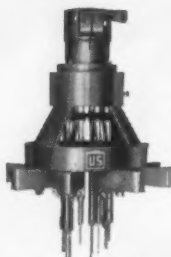
For men who know Drill Heads Best...
it's always

U.S. DRILL HEAD

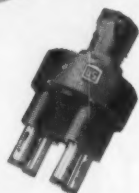
5 to 1



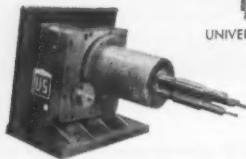
FIXED CENTER
OIL CIRCULATING



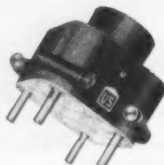
UNIVERSAL JOINT



FIXED CENTER
GREASE LUBRICATED



INDIVIDUAL LEAD SCREW TAPPER



STANDARD ADJUSTABLE



THE UNITED STATES DRILL HEAD COMPANY

BURNS STREET • CINCINNATI 4, OHIO

For more data circle 439 on Reader Service Card



Improve Monday morning efficiency—switch to **STUART SOLUBLE OILS** with guaranteed longer service life!

Anaerobic bacteria (present in practically all machine shops) thrive in your water-mix cutting and grinding fluids and generate that expensive perfume known as "Monday Morning Odor." Expensive because it's a sure sign the stability of the compound is being damaged—service life shortened—and because your workers' efficiency is bound to suffer.

So regardless of your experience with other bactericides, it will pay you to try Stuart's heavy-duty soluble cutting and grinding compounds with the anaerobic bacteria inhibitor that's *guaranteed* to keep the emulsion stable and sweet three to four times longer than other water mixtures... even in hot weather and through long shutdowns when bacteria multiply fast.

LONGER SERVICE LIFE GUARANTEED

Talk the problem over with your Stuart engineer and place a trial order for Solvol "X," Codol "X," Dasco Super Soluble "X" Base, or new general-purpose Dasco D-20—whichever of these top-quality, heavy-duty cutting and grinding compounds best fits your needs. D. A. Stuart Oil Co., Limited *guarantees your complete satisfaction* with the bacteria resistance of these compounds, on a money-back basis! Phone your Stuart Service Center... before "Monday Morning Odor" hits your plant for another efficiency loss.



Phone your
Stuart
Service Center

Arrange now to test Stuart's water-mix cutting and grinding fluids on your difficult machining jobs.

DETROIT, MICH. Tyler 7-8500
CHICAGO, ILL. Bishop 7-7100
HARTFORD, CONN. Jackson 7-1144
CLEVELAND, OHIO Prospect 1-7411
PHILADELPHIA, PA. Devonshire 8-6100
TORONTO, CANADA Oxford 9-9397

Representatives in all principal cities

SINCE 1885
D. A. STUART OIL CO., LIMITED
237 South Troy Street, Chicago 23, Illinois
CANADIAN D. A. STUART OIL CO., LIMITED
2575 Danforth Avenue, Toronto 12, Ontario



METALWORKING LUBRICANTS

SOLVOL "X" • DASCO D-20 • CODOL "X"
DASCO SUPER SOLUBLE "X" BASE

For more data circle 440 on Reader Service Card

August, 1957

modern machine shop 185

news of the industry . . .

pointment was made to fill the vacancy created by the resignation of Joseph G. Magrath, who served as secretary for many years.

Mr. Plummer, a graduate of Ohio University and Case Institute of Technology, has served since 1940 as director of engineering of the Hammond Iron Works, Warren, Pa. Previously

Mr. Plummer was a professor in engineering subjects at Case Institute of Technology as well as a consulting engineer.

He has been active in the affairs of the American Welding Society for many years and was elected to two terms as president of the Society, holding office from 1952 through 1954. He has served as chairman of many committees in the Society and last May was awarded the Society's Samuel

Wylie Miller Memorial Award for outstanding contributions to the welding industry. In 1956 he was made an honorary member of the Japan Welding Society in recognition of the work he did there at the outbreak of the Korean War to help Japanese industry produce steel structures needed by the United Nations forces.

STANDARD HEAVY DUTY SUPER PRECISION SPINDLES

"Masters of Milling"



AMERICA'S MOST EXTENSIVE LINE OF MILLING SPINDLES!

From 1 to 200 HP with standard tapers, #20 to #60. To satisfy every milling demand — enclosed, totally enclosed fan-cooled, high cycle and liquid-cooled. Motorized or Belt-Driven. Variable, single or multiple speed motor — Speed to suit your application.

A milling spindle for every purpose . . . and more than that . . . a milling spindle reflecting in its SUPER CAPACITY AND TROUBLE FREE OPERATION the four decades of its maker's experience in spindle manufacturing. And "special problems"? . . . get the answer from Standard experts!


FOR COMPLETE SPECIFICATIONS AND DIMENSION DRAWINGS OF MORE THAN 75 MILLING SPINDLES, WRITE TODAY!

SUPER PRECISION SPINDLE DIVISION

the STANDARD electrical tool co. SINCE 1912

STANDARD SETS THE PACE!

2487 RIVER ROAD • CINCINNATI 4, • OHIO



REGISTERED TRADE MARK OF THE COMPANY

For more data circle 441 on Reader Service Card

Portage Double Quick, Inc., Akron, Ohio, recently announced the opening of a West Coast office and warehouse located at 529 Rosecrans Ave., Compton, Calif. The new warehouse will



UP TO 95% EFFICIENCY!

Yale Load King Hand Hoists with capacities from $\frac{1}{2}$ to 2 tons are ideal for use in machine shops because you get mechanical efficiencies as high as 95%. This means fast hoisting with less pulling effort. What's more, Load Kings are light in weight—a powerful two-ton model weighs only 73 lbs.! Other features include: ball bearings on all rotating shafts and instant, automatic, safe-hold brake action. For extra heavy-duty lifting jobs, find out about new Yale Load King Hand Hoists with capacities up to 12 tons. For full facts, write The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. A-1288.

YALE*

*REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

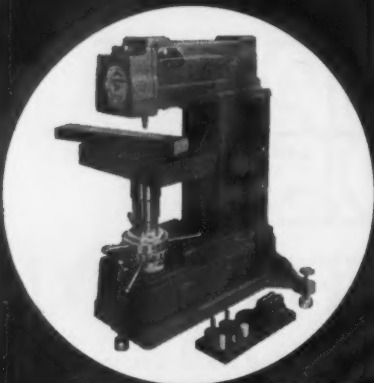
Gasoline, Electric & LP-Gas Industrial Lift Trucks • Worksavers • Warehouse
Hand Trucks • Hand and Electric Hoists

For more data circle 442 on Reader Service Card

2 Applications

(Regular and Superficial)

1 Tester



KENTRALL MODEL CT-2 \$680.

Hundreds of installations over the past few years have proved the economy of the only hardness tester which combines all scales of Rockwell Test (15 to 150 kg. loads).

The Kentrall cuts costs because it does the job of two conventional testers, requires only half the space and maintenance. Write for more detailed information, plus a list of prominent users who have switched to Kentrall.

TB147

KENTRALL

THE TORSION BALANCE COMPANY

Main Office and Factory:

Clifton, New Jersey

Sales Offices: Chicago, San Francisco

For more data circle 443 on Reader Service Card

188 modern machine shop

news of the industry . . .

help speed deliveries in the Western states and will carry a complete inventory of all of the Portage Double Quick lines including quick change tools for milling machines and turret lathes, carbide cut-off tools for turret lathes and automatics, carbide face mills, micrometer adjustable boring bars, groove checking gages, tool bits and cartridges.

David W. Puckett has been appointed West Coast Division manager and will be in charge of the company's new offices and warehouse. Mr. Puckett has had a wide experience in sales, tooling and service work in the machine tool field. He has also been associated with various mill supply houses in the East and Los Angeles area.

★ ★ ★

PRATT & WHITNEY INAUGURATES MAJOR EXPANSION OF BRANCH SALES OFFICES

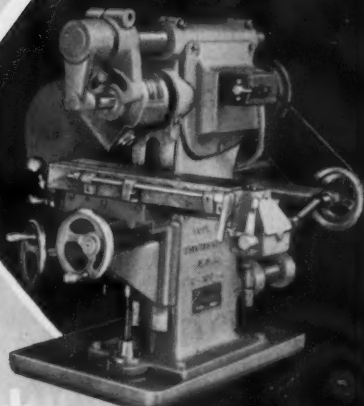
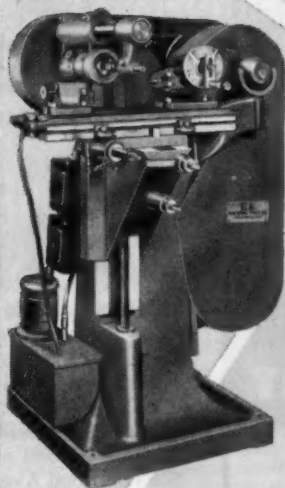
Pratt and Whitney Co., West Hartford, Conn., recently announced plans for increasing the number of branch sales offices by more than 50 per cent. Before the end of the year, new offices will have been established in nine cities in the United States, in addition to the present 16, and two major offices in Rochester, New York and Hartford, Connecticut will move to new expanded locations. The sales force of the company had been increased by 16 thoroughly trained men since the first of the year and further increases before the end of the year were indicated.

Pratt and Whitney, a subsidiary of the Penn-Texas Corp., has already inaugurated an advanced sales training program for its sales personnel. The first new branch to be opened will be at 1220 E. Fourth St., Charlotte, N.

August, 1957

Small parts bottlenecks
strangling your
milling department

?



U * S * Burke

MILLING MACHINES

Free Big Mills for Big Jobs!

No. 1 U. S. MILLING MACHINE

The top-quality, precision mill, economically priced! Hand operation, or air-hydraulic feed for high production.

Accurate and simple-to-operate, brings small part production into balance, avoids wasted time and investment in big mills.

Excellent for keyways, quantity runs of sectors, short racks, simple profiling, sawing, slotting, squaring, cut-off, short-run splining, even light slab milling.

BURKE BENCH MILLERS

Small part milling accuracy for toolroom or production uses . . . 2 hand and 2 power feed models.

Rugged frame, hand scraped thru-out, Timken bearings . . . time-tested design for accurate milling, drilling, sawing, boring, facing and slotting of small parts.

Wide range of speeds. Dependable performance and ease of set-up lower operational costs. Vertical Milling Attachment and complete range of other accessories.

Write for complete specifications and prices

U * S * Burke

MACHINE TOOL DIVISION

3 Brotherton Road • Cincinnati 27, Ohio

Manufacturers of the U. S. Vertical Milling Machine and the radically new U. S. Quartet

For more data circle 444 on Reader Service Card

news of the industry . . .

C., where facilities have been leased, under the managership of James F. Royster. He will be in charge of machinery sales, as well as cutting tool and gage sales. This will be followed by a new branch in Milwaukee, Wis., located at 92nd and West Center Streets. Fred D. Watson will manage

sales of cutting tools and gages and Arthur Laducer will be in charge of machine tool sales.

In Buffalo and Syracuse, N. Y., sub-branches will be fully stocked to serve the requirements of Pratt and Whitney customers in each area. The Buffalo branch will be headed by Albert V. Darsh and the Syracuse branch by Laurence D. Gillane. Five additional branch offices in as many large industrial centers will complete the program for the immediate future.

At West Hartford, where the company's local sales office occupies part of its principal headquarters, an entirely new office and stockroom, covering approximately 40,000 square feet, will soon be opened at 505 Oakwood Avenue. Machinery sales at the West Hartford branch will be under the direction of Paul C. Renno and cutting tool and gage sales will continue to be headed by H. H. Wilbraham.

★ ★ ★

ATOMIC TRAINING REACTORS

An agreement has recently been announced between AMF Atomics Division of American Machinery and



**Conversion to
NYLON-GEAR
BY SMALL-LOT
MOLDING PROCESS**

ACTUAL SIZE ACTUAL SIZE

SAVES 26¢ PER UNIT

This Zytel 101 Nylon Beveled Gear replaced a machined gear that formerly cost 59¢ each. After the initial tooling costs we die-molded it in one operation by our special injection process at 33¢ each.

COST ANALYSIS:

Tooling, set-up and first 100 pieces,
including material and trimming

\$286⁰⁰

Additional 100 lots: **\$33.00**

In addition to a cheaper piece price and equal wearing qualities, the Nylon Gear proved rustproof, noiseless, required no oiling and weighed less.

Let us quote on your Short-Run Plastic Moldings.
We will gladly submit quotations without obligation.

DAYTON ROGERS
Manufacturing Company

MINNEAPOLIS 7D, MINNESOTA

For more data circle 445 on Reader Service Card

Low cost—high speed hard-facing with the new METCO THERMOspray process



Hard-facing pump rod with
the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies —simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOspray GUN and the THERMOspray Hard-Facing Alloys, these disadvantages have been overcome.

The THERMOspray GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMOspray Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed Metco Process, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



**Metallizing
Engineering Co., Inc.**

1177 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.
Chobham near Woking, England

The following trade names are the property of
Metallizing Engineering Co., Inc.:
METCO*, ThermoSpray *Reg. U. S. Pat. Off.

Don A. Watson
Metallizing Engineering Co., Inc.
1177 Prospect Ave., Westbury, L. I., N. Y.
Please send me more information

- ☐ about the New ThermoSpray Gun
- ☐ about ThermoSpray Hard-Facing
- ☐ Please arrange a demonstration in my shop.

name _____
company _____
street _____
city _____ zone _____ state _____

For more data circle 446 on Reader Service Card

news of the industry . . .

Foundry Co., Bloomfield, N. J., and Dr. Walter H. Zinn's General Nuclear Engineering Corp., Dunedin, Fla., to design and produce training reactors for use by universities and industry. The new AMF-GNE "Educator" reactor is an improved version of the Argonaut design developed by the

AEC's Argonne National Laboratory. Under the agreement, the design is being done by GNEC with construction being handled by AMF Atomic Division engineers.

Rated at 10 kilowatts for continuous-duty operation, the water — and graphite — moderated reactor is characterized by minimum excess reactivity, low fission-product content and self-limitation of power. The "Educator" reactor design is, therefore,

inherently safe, making it suitable for use by students or industrial researchers for training in reactor physics and engineering, nuclear physics, radiochemistry, radiobiology and related fields. It will supplement AMF Atomics rapidly growing research reactor program which now calls for 13 installations both in the U. S. A. and abroad.

★ ★ ★

RACINE AND SECO MERGE

A merger has recently been negotiated between Simplex Engineering Co., Inc., Zanesville, Ohio, and Racine Hydraulics and Machinery, Inc., Racine, Wis. The merger, involving a transfer of stock,

CUT THESE 5 COSTS IN YOUR PLANT

Machine-installation cost — cut 70%

Plant-layout-change cost — cut 90%

Production-labor cost — cut 20%

Rejects — cut 100%

Tool-change time — cut 80%

These proved savings are being gained by such companies as Inland Steel Products, American Type Founders, Johnson & Johnson, The Colorado Fuel & Iron Corp., Wyman-Gordon, Reed-Prentice, Bullard Company, and many more.

How? By using Barry Leveling Machinery Mounts to make production machinery mobile and to protect machines and buildings from damaging vibration.

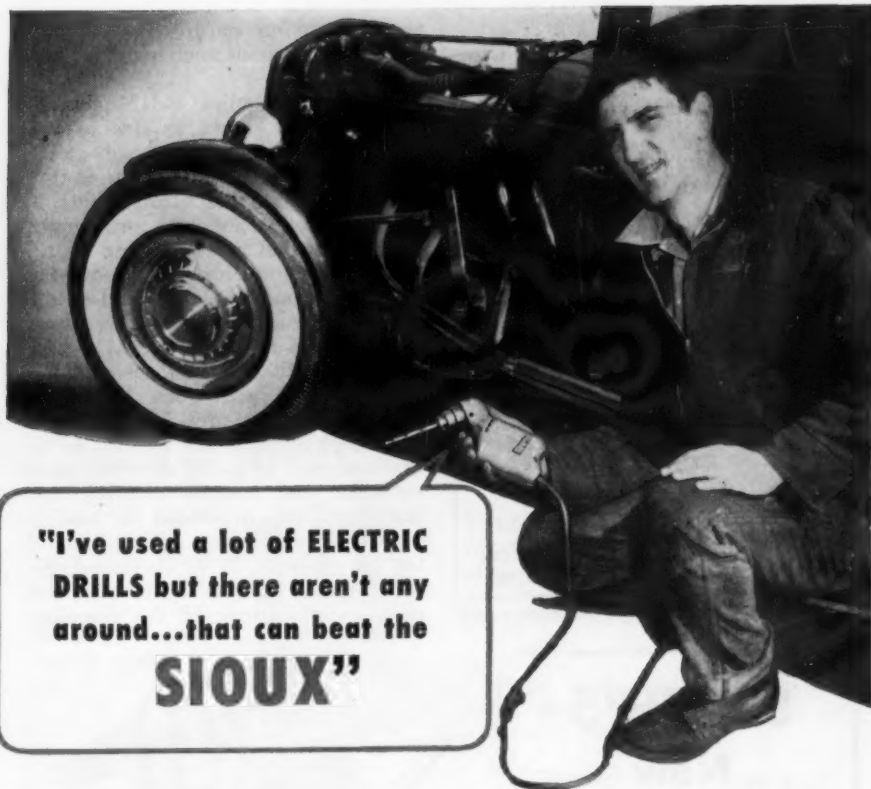
FREE! "Proof-of-performance" Reports give details of savings gained in large and small plants. Write now for your copies.

**BARRY
CONTROLS**
INCORPORATED

BARRY B MOUNT
SOLD THROUGH INDUSTRIAL
DISTRIBUTORS

783 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS

For more data circle 447 on Reader Service Card



"I've used a lot of ELECTRIC DRILLS but there aren't any around...that can beat the SIOUX"

"I've been meaning to write this letter to you people for a very long time. In 1952 I bought a 6" Ball Bearing Bench Grinder, a Half Inch Heavy Duty Drill and also a No. 1495 1/4" ALL-ANGLE Drill. In all that time I haven't had a bit of trouble with any of these tools.

All three tools are great, but the 1/4" ALL-ANGLE Drill is the reason I'm writing this letter. I've used a lot of electric drills but there isn't any around that is made that can beat the SIOUX. With that drill, you can get into the tightest place that you can put your fist into.

You can put oversize drills into it and it won't die out on you. It's the most compact, the most rugged piece of equipment I've used. It couldn't be designed any better, I don't think, and whoever had the brains to design that really deserves a lot of credit.

He must have had us in mind when he designed it because it's *perfect*. In our kind of work we have to be fussy and we don't pass out compliments too easy, but there are so many poorly designed tools for sale, that I really thought you deserved these compliments.

I've never written to a manufacturer before but I appreciate working with good tools and I have to give your drill a lot of credit for our prize winning cars. A lot of people have bought the offset drill after using mine. It sells itself very easily.

You're perfectly welcome to do as you please with this letter, and I would endorse any of your products."

JOHN SHARRIGAN, Watertown, Mass.



ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.



ELECTRIC DRILLS • SCREW DRIVERS • SANDERS • GRINDERS • IMPACT WRENCHES • VALVE FACE GRINDING MACHINES • POLISHERS • PORTABLE SAWS • FLEXIBLE SHAFTS • ABRASIVE DISCS

For more data circle 448 on Reader Service Card

news of the industry . . .


has been jointly announced by both companies.

Racine Hydraulics manufactures a medium pressure line of hydraulic pumps, valves, power units and controls. Simplex Engineering produces the SECO line of high pressure equip-

ment of similar nature. Basic operations will continue unchanged by both companies.

Racine Hydraulics and Machinery, Inc., formerly known as Racine Tool and Machine Company, was begun in the late 1920's. Its equipment is used in motor car manufacturing plants, by the machine tool industry, press builders, makers of earth-moving equipment, mining machinery, laundry and textile machine producers and a wide range of equipment requiring power movement in its operation. M. E. Erskine heads the company, as president and treasurer, with John E. Erskine as executive vice president.

Simplex systems are applied to operations such as metal drawing, metal extrusion and transfer molding. The company has developed a custom-built hydraulic power package including all controls. T. E. Raymond, Sr., who founded Simplex in 1927, is president and treasurer of the company.



Model
UL 7120

The Leading Machine
Tool Manufacturers
use

**RUTHMAN
GUSHER**
COOLANT PUMPS

THE RUTHMAN MACHINE CO.
1817 Reading Rd., Cincinnati 2, Ohio

For more data circle 449 on Reader Service Card

SMITH'S New and Improved ADJUSTABLE MULTI-ANGLE GRINDING FIXTURE (PATENTS PENDING)

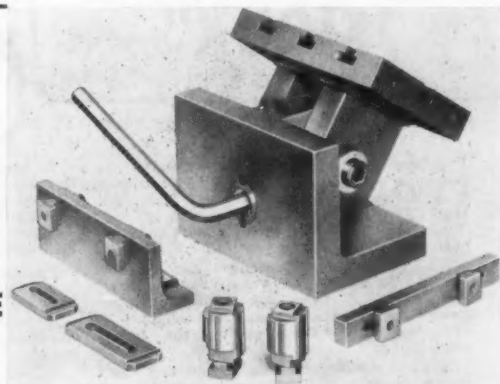
FEATURES:

- Easy Adjustment—worm gear operated to all angles, compound and standard • Use horizontally and vertically • All moving parts completely sealed • Two Sizes: 3" x 3" and 4 1/2" x 3".

Write for Illustrated Circular and Prices

F. E. SMITH, Toolmaker

840 SOUTH MAIN ST.
ATTLEBORO, MASS.



SAVES ITS COST QUICKLY

For more data circle 450 on Reader Service Card

industry news in brief . . .

Edward J. Ferris, Jr., promoted to factory manager, Machinery Division, **Pratt and Whitney Company, Inc.**, West Hartford, Connecticut.

Ronald E. Stenning appointed director of education and **George N. Levesque** appointed director of research, **Brown and Sharpe Manufacturing Company**, Providence, R. I.

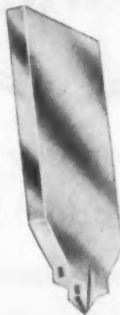
Chicago - Latrobe, Chicago, Illinois, has recently announced the appointment of three new sales representatives: **Herb Dart-sch** to cover Chicago area; **Jim Marshall** to cover Detroit area; and **Everett E. Slitor** to cover Southern Ohio area. **R. E. Thornberry** has joined the staff as service engineer. **R. D. Myers**, sales and service engineer transferred to Portland, Oregon, to cover the Pacific Northwest territory for Chicago-Latrobe.

Bruce S. Williams appointed sales engineer in Chicago area, **The Capewell Manufacturing Company**, Hartford, Connecticut.

Dr. Theodore T. Magel was appointed assistant to the vice president and technical director, **Allegheny Ludlum Steel Corporation**, in Pittsburgh, Pennsylvania.

William D. Angell, vice president, **Moore Special Tool Company, Inc.**, Bridgeport, Connecticut, recently retired after 31 years with the company. **Nils Lindstrom** succeeds Mr. Angell as superintendent.

New B & W ADAPTERS for Flat Form Drills Fit all B & S Screw Machine Holders



Your satisfaction guaranteed on form cutters made for non-ferrous applications.

Do More Work

with Less Tooling

Cut your costs with B&W flat form drills and step cutters with this new adapter — they're

Tested and Proven

Use them in floating and other types of holders. Positive lock, blades are easily and quickly changed without changing setup.

Small Investment

Pays Big Returns

Streamline your automatic screw machine production with B&W Flat Step Drills and this new Adapter!

Send for literature and prices.

Shipped from stock for all B&S Holders

B & W PRECISION PRODUCTS CO.

11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

For more data circle 451 on Reader Service Card

Pay for Norton grinding machines while they build



*Now you can buy or lease
the most modern grinding
or lapping equipment
on convenient,
economical terms*

By replacing your obsolete grinding and/or lapping equipment with new Norton machines you can meet competition with the best production tools in the field.

You can now gain this competitive strength without risking financial weakness. Two Norton methods offer you logical, economical ways to modernize without jeopardizing your capital position — and without the need of borrowing or of raising money by any other means.

THE NORTON PURCHASE FINANCING PLAN

This Time Payment Plan enables purchase of new machines on extended terms. Simplicity is the keynote. Upon a down payment of 25% of the original purchase price, terms may be extended up to a maximum of five years, at an interest charge of $3\frac{1}{4}\%$ per year. Payments are equal and quarterly, starting 60 days after delivery. In the event that you wish to pay off the entire balance at any time, a discount approximately equal to the unearned interest will be allowed.

THE NORTON LEASE PROGRAM

This Program includes three tested plans for leasing new Norton grinding or lapping machines. Each plan offers you the option of terminating the lease or

purchasing the equipment after a stated period. Particular advantages of the Lease Program are: (1) You can acquire needed machines for just the period in which you can use them profitably, thus eliminating the obsolescence factor; (2) You can make a thorough trial of equipment without going to the expense of actual purchase, unless you decide to do so later.

A Wide Choice of Machines

Norton machines available under the Purchase Financing Plan and Lease Program include a broad selection of the most popular types of grinders and lappers. Special arrangements will be considered whenever other Norton machines are required.

For Further Information

see your Norton Representative. He will be glad to discuss the relative merits of each Norton financing method, with regard to your particular requirements. He will also give you complete details of the various machines available and advise you as to which are best suited to your production needs. Or you can write direct. And remember: only Norton offers you such long experience in both grinding machines and grinding wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

To Economize, Modernize with NEW



GRINDERS and LAPPERS

District Offices: Worcester • Hartford • Cleveland • Chicago • Detroit

*Making better products...
to make your products better*

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

For more data circle 452 on Reader Service Card

industry news in brief . . .

George M. Class elected to board of directors, Gisholt Machine Company, Madison, Wisconsin.

Bruce E. Horst appointed sales manager, Barber-Colman Company, Machine Tool Division, Rockford, Illinois. Wesley Morse replaces Mr. Horst as sales representative.

Newcomer Products, Inc., Latrobe, Pennsylvania, has announced the opening of a new sales office at 1820 East 79th Street, Chicago 49, Illinois. The following sales representatives were appointed: **The Cleaves Company**, 3694 Kettner Boulevard, San Diego 1, California; **Claude Mann and Associates, Inc.**, 2514 East Douglas, Wichita, Kansas; **Wetzel Tool Sales Company**, 292 Worthington Street, Springfield, Massachusetts; **August F.**

Huge and Son, Inc., 1712 Austin Street, Houston 3, Texas; and **Mason and Luttrell**, Bank Building, Post Office Box 445, Okemos, Michigan.

Sales Service Machine Tool Company, 2363 University Avenue, St. Paul, Minnesota, appointed exclusive distributor in Minnesota, **La-Pointe Machine Tool Company**, Hudson, Massachusetts.

Metalclean Equipment Company, 177 Stoneway Lane, Bala-Cynwyd, Pennsylvania, appointed distributor in the Philadelphia - Camden, Harrisburg, Delaware and Maryland area, **Octagon Process, Inc.**, Staten Island, New York.

... *the Quality Line*

STEEL
Stanho
PRODUCTS

Stainless Steel
TAPER PINS

Complete stock, all sizes #7/0 through #14.
Special sizes to order.
Milled or Centerless Ground (Precision Type).
Made to accurate tolerances.

Also "Stanho" Taper Pins made from selected screw stock, Monel, Brass, Aluminum or other metals. Clean bright finish—prompt shipments.

Write for description and prices.

JM-6

STANDARD
Since 1872
HORSE NAIL CORP.
NEW BRIGHTON, PA.



For more data circle 453 on Reader Service Card

Scully-Jones and Company, Chicago, Illinois, has announced the appointment of five new distributors: **Cutting Tools, Inc.**, 624 North Skinker Boulevard, St. Louis, Missouri; **Oliver H. Van Horn Company, Inc.**, 1742 St. Charles Avenue, New Orleans, Louisiana; **Farquhar Machinery Company**, 2120 Market Street, Jacksonville, Florida; **Garrett Supply Division, The Garrett Corporation**, 3844 South Santa Fe Avenue, Los Angeles 58, California; and **Schultz Industrial Supply Company**, 2826 Niles Avenue, St. Joseph, Michigan.

Glen H. Rea-rich, member of vice president's staff and manager, **The Babcock and Wilcox Company**, Tubular Products Division, Beaver Falls, Pennsylvania, recently retired after 41 years with the company. **J. Y. McCandless** named manager of Syracuse, New York district sales office.

James A. Lind named vice president, finance, and will continue his present post of treasurer, and **John F. Corkery** has been appointed vice president, public relations, **Thor Power Tool Company**, Aurora, Illinois.

Charles J. Wade appointed controller, **Adamas Carbide Corporation**, Kenilworth, New Jersey. **Erie Industrial Supply Company**, 1616 West Eighth Street, Erie, Pennsylvania, appointed authorized Adamas distributor in the northwestern Pennsylvania area.

Ernest F. Dooley appointed carbide tool engineer, **Jarvis Corporation**, Middletown, Connecticut.

THE NEW IMPROVED PALMGREN



Rotary and Indexing Table with Graduated Rotary Feed

No. 86 Table

The No. 86 Rotary and Indexing Table by Palmgren has been a basic tool for years, and now with these new improvements it is even more essential than ever in lowering costs and increasing production in every metal working or wood working shop. Check these features: 8" dia. top with $\frac{5}{8}$ " x 1" x $\frac{3}{16}$ " T slots. Rotary Top graduated to full 360° with rotary feed positive through worm and gear with ratio of 40-1. Rotary indexing dial accurately graduated in three minute intervals. Two hold down screws furnished to lock table top in position after indexing. Overall height is only $3\frac{1}{4}$ " which makes the No. 86 an ideal tool for jobs where the fixture is large and takes up too much distance between the spindle and the machine table. Two $\frac{3}{8}$ " keys and screws are provided for machine mounting. Ruggedly built for years of precision work.

Order today or send for new Catalog No. 205 complete with prices.

ONLY
\$69.95

CHICAGO TOOL AND ENGINEERING CO.

8399 South Chicago Ave. • Chicago 17, Illinois

For more data circle 454 on Reader Service Card

industry news in brief . . .

Dvorak Machinery Company, 7001 West North Avenue, Oak Park, Illinois, appointed exclusive distributor in Chicago area, **The Hamilton Tool Company**, Hamilton, Ohio.

Vascoloy-Ramet Corporation, Waukegan, Illinois, has opened a branch office located at 1514 North Pennsyl-

vania Avenue, Indianapolis 2, Indiana, staffed by **A. A. Strawn** and **H. C. Hauck**.


James A. Kearney and **Robert A. Pitcairn** appointed group leaders in the development group, **Crucible Steel Company of America**, Pittsburgh, Pennsylvania. **George W. Stamm** elected vice president and general manager of sales. **Charles D. Preusch** appointed chief metallurgist, Spaud-

ing Works, Harrison, New Jersey. **C. J. Ryan** appointed assistant to vice president-sales. **M. J. Dempsey** succeeds Mr. Ryan as manager. **J. J. Wycall** appointed manager of St. Louis branch. **K. C. Kelly** appointed Southern regional sales manager and **R. D. Leslie** appointed assistant manager. **Robert D. Graham** appointed superintendent of Cold Strip Mill at Midland, Pennsylvania Works. **Harold Kazen** succeeds Mr. Graham as assistant superintendent of Cold Strip Mill.

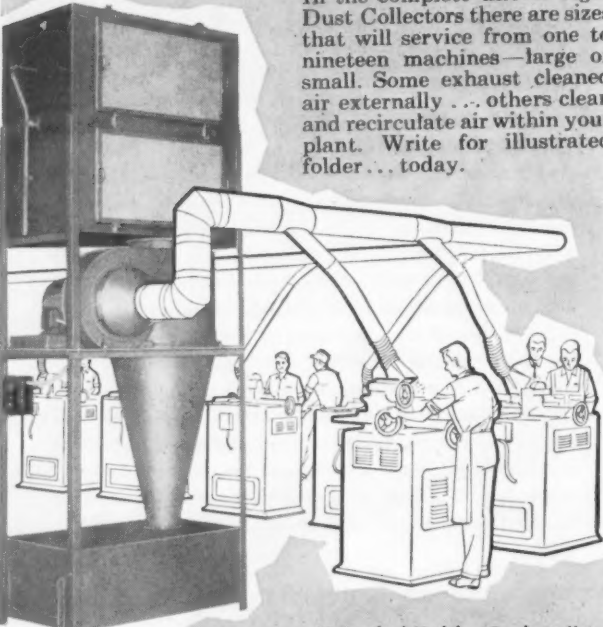
W. A. Johnson has been named sales manager, **Royal Oak Tool and Machine Company**, Grinder Division, Royal Oak, Michigan.

just **ONE**

heavy duty unit services up to 19 MACHINES



In the complete line of Aget Dust Collectors there are sizes that will service from one to nineteen machines—large or small. Some exhaust cleaned air externally . . . others clean and recirculate air within your plant. Write for illustrated folder . . . today.



46 Standard Models—Ready to Use

AGET manufacturing company
1398 Church Street • Adrian, Michigan

For more data circle 455 on Reader Service Card

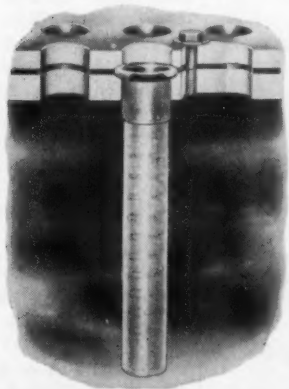
Cost Reducer—

**Filter Your Way to Greater Profits
with the**

Delpark Filter-Matic

TUBULAR SCREEN VACUUM FILTER

Delpark Filter-Matics have widened the spread between cost of manufacture and profit by eliminating certain costs and reducing others.



On grinding operations Delpark Filter-Matics reduce costs these ways:

1. By extended grinding wheel life.
2. By removing contaminants from coolant—extending coolant life.
3. Reduces rejects due to off size by lowering coolant temperature.
4. Reduces rejects due to scratches caused by abrasives carried back to the work in the coolant.
5. Uses permanent filter media.
6. Gives micro-inch finish requirement filtration.

Write today for more complete information on the new Filter-Matic Filter and ways with which it can save you more money.



... FIRST in Filtration Advancements

INDUSTRIAL FILTRATION COMPANY

**13 INDUSTRIAL AVENUE
LEBANON, INDIANA**

For more data circle 456 on Reader Service Card

industry news in brief . . .

Charles W. Moore appointed representative for West Virginia, Western Ohio and Kentucky, **Union Twist Drill Company**, S. W. Card Division, Athol, Massachusetts.

Robert F. Reid appointed sales manager, **Arter Grinding Machine Company**, Worcester, Massachusetts.

Raymond C. Bullard has retired after 35 years with the **Bullard Company**, Bridgeport, Connecticut. William C. Neu succeeds Mr. Bullard as advertising manager.

Pearse-Dengel Tool Company, 181 Boulevard, Hasbrouck Heights, New Jersey, appointed distributor in Metropolitan New York area, **Engis Equipment Company**, Instrument Division, Chicago, Illinois. **The Chagnon**

Company, 70 Mack Street, Windsor, Connecticut, appointed exclusive representative in Connecticut and New England areas.

Thor Power Tool Company, Chicago, Illinois, recently moved its Houston, Texas, office from 7241 Harrisburg Boulevard to new and larger quarters located at 5503 Lawndale Avenue.

Dale V. Cropsey appointed assistant to the president, as supervisor over electronics and abrasives divisions, **Elgin National Watch Company**, Elgin, Illinois. William E. Burgoyne, Jr., appointed sales engineer in New York City area.



milling cutter Arbors

- made of alloy steel, heat treated for maximum toughness
- precision ground to ensure concentricity of nose and taper shank
- hardened drive keys securely held by cap screws
- replaceable in case of damage

Flywheels

- Improve milling cutter performance
- Increase cutting blade life
- available in three styles, for mounting on the spindle of any machine

Write for Catalog No. 33

LOVEJOY TOOL COMPANY, INC.

130 Main Street, Springfield, Vermont

For more data circle 457 on Reader Service Card

Charles C. Cheyney, vice president in charge of sales for the **Buffalo Forge Company**, Buffalo, New York, died recently at the age of 68.

The **L. S. Starrett Company**, Athol, Massachusetts, announced the appointment of four salesmen: **Richard H. Chace** appointed to the San Francisco area; **Charles B. Whipps** appointed to Toronto area; **Allen B. Carruth** appointed to Atlanta area; and **Robert J. Carney** appointed to Los Angeles area.

The Southern Tool Distributing Company, Atlanta, Georgia, appointed sales representative, **Taft Peirce Manufacturing Company**, Woonsocket, Rhode Island. **Harry P. Leu, Inc.**, 100 West Livingston Avenue, Orlando, Florida, appointed representative for Florida.

Clemson Brothers, Inc., Middletown, New York, announced three appointments: **R. C. Griggs** named general superintendent; **Joseph A. Schrade** named products manager; and **Bernhard Blikstad** appointed purchasing agent.

Howard W. Arnold named manager of product planning and marketing research, **General Electric Company**, Metallurgical Products Department, Detroit, Mich.

The **Noland Company, Inc.**, 301 West Eighth Street, Chattanooga, Tennessee, appointed distributor in Georgia and Tennessee, **Niagara Machine and Tool Works**, Buffalo, N. Y.

LUBRICATION ECONOMY

"THIS LUBRICANT EXTENDED BEARING LIFE 50%"

says REPUBLIC AVIATION CORP.

ALSO MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER



LUBRIPLATE H.D.S. MOTOR OIL... THE OIL THAT NEEDS NO ADDITIVES



... "It was also found that, during test, LUBRIPLATE increased efficiency of machines twenty per cent by reducing friction loss. Republic has been using LUBRIPLATE Lubricants successfully for the past eight years."

1. LUBRIPLATE reduces friction and wear.
2. LUBRIPLATE prevents rust and corrosion.
3. LUBRIPLATE is economical to use.

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N.J.—Toledo 5, Ohio

The Different LUBRICANT!

DEALERS EVERYWHERE, consult your Classified Telephone Book

For more data circle 458 on Reader Service Card

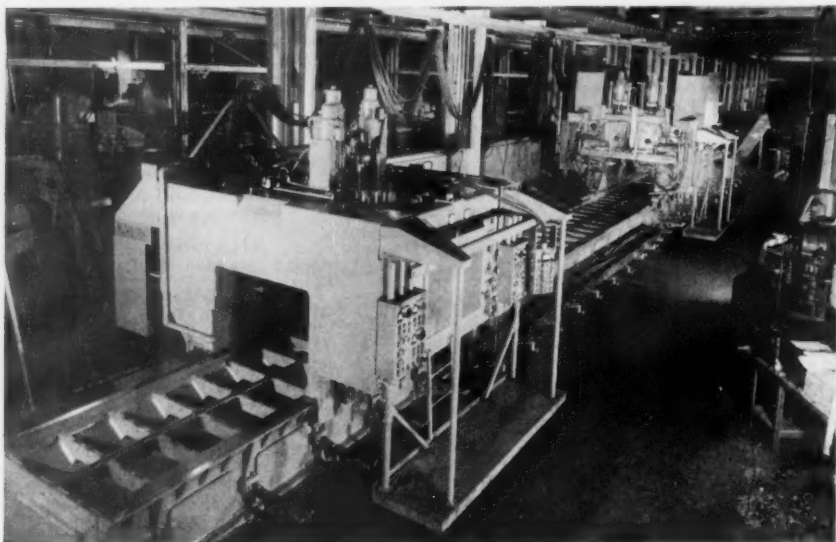
new shop equipment and

**Descriptions of new machines, tools
and materials for metalworking.**

**ELECTRONIC MILLING MACHINE
FOR SEAPLANE PRODUCTION**

Onsrud Machine Works, Inc., Machine Tool Division, 7720 North Lehigh Ave., Niles 31, Ill., has developed a milling machine for producing the scores of huge parts that make up the structural members of seaplane wings. The total wing area is over 1,900

square feet and all of the wing spars, ribs and related structural members involve complex contour and cut out production milling. This Onsrud A90-36 Contour Milling Machine is 96 feet long. It is built with two traveling carriages, on which are mounted a total of six high speed, electronic, tracer controlled milling heads. All six milling heads may be operated at one time



This Onsrud A90-36 Contour Milling Machine has been designed for the high speed production milling of all wing structural parts of the Navy's Martin SeaMaster Seaplane.

This huge milling machine is 96 feet long, is built with six high speed, multiple feed milling heads, two traveling carriages and is completely electronically tracer controlled.

ent and shop materials

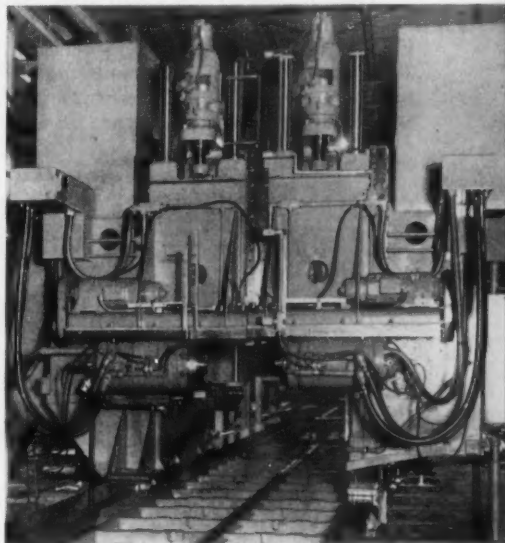
Edited by L. L. BALDHOFF

or in any sequence required. In addition to the longitudinal feed of the carriage, up to 14 electronically tracer controlled milling head feeds are available, making it possible to mill any type of straight, tapered or contoured face that might be needed.

The types of machining that may be performed and the capacity of the overall machine can be visualized from the following description of cutter head motors and feeds. Carriage No. 1 houses two vertical cutter motors. Each motor is a two speed, 30/60 h.p., 3,600/7,200 r.p.m. liquid cooled induction motor, with three electronic tracer controlled feeds, carried out separately or in any combination. These feeds are transverse, vertical rise and fall and twist in a range of 20 degrees plus or minus vertical. Carriage No. 2 houses four cutter motors, all liquid cooled. The first two of these are each 100 h.p., 3,600 r.p.m. induction motors. Each motor is capable of two electronic tracer controlled feeds; transverse and vertical rise and fall.

The remaining two motors are mounted on a common slide and are capable of three electronic tracer controlled feeds; vertical rise and fall motion and twist motion in common and transverse feeds independent of one another. The range of twist feed is 20 degrees plus or minus horizontal. Each motor is a 60 h.p., 3,600 r.p.m. unit. The template to cutter ratio is 1 to 1 for linear feeds and 0.180 to 1

degree for twist feeds. Mechanical contact of tracers by followers is converted to electronic signals and feed through the electronic system to control feed positions of the cutter heads to mill work as required. Feedback systems and electronic compensating controls are combined with many unusual structural features in mechanical machine tool design to give speed and



End view of No. 2 carriage of Onsrud A90-36 Automatic Contour or Spar Mill. Two horizontal 60 h.p., 3,600 r.p.m. cutter motors are mounted on a common slide.

new shop equipment . . .

precision in all milling operations. Inertial factors that have provided design problems in equipment of this type in relation to speed and accuracy are claimed to have been eliminated to an unusual degree.

The overall size of this particular machine is 96 by 15 feet 6 inches. Bed working width is 60 feet 36 inches, with additional open area between carriage uprights for work widths up to 48 inches. Design of the machine is such that any required width and length can be supplied to customer's specifications.

For more data circle 95 on Reader Service Card

★ ★ ★

TAPE CONTROLLED JIG BORER

The Fosmatic Tape Controlled Jig Borer was introduced recently by The Fosdick Machine Tool Co., Cincinnati 23, Ohio. This development makes practical the use of jig borers for small and medium production runs, provid-

ing very close tolerances without special jigs and fixtures. This is due to the fact that a highly skilled operator is no longer needed, since the machine has taken over functions formerly dependent on the operator's skill and judgment.

In operation, the operator simply loads the part to be machined on the jig borer table. He presses a button which positions the table to plus or minus 0.0001 inch and sets the spindle speed and feed according to values punched in the tape.

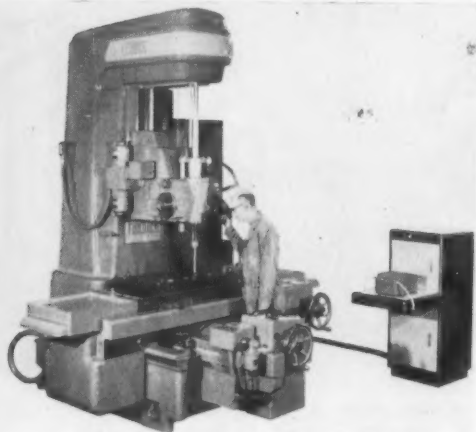
Tapes are prepared in the engineering department where the most efficient order of operations is programmed. Dimensions from part prints are punched directly into the tape without the need for coding, since a decimal tape punch is used.

Tools are set in the toolroom and numbered according to the operations program. The operator will only need to follow the program, thus eliminating another opportunity for human error.

According to the manufacturer, additional benefits of the tape controlled jig borer are reduction of scrap, elimination of costly jigs and speedy operation. Tapes are usually stored away so that production runs of the same part can be repeated exactly at later dates.

The measuring system used allows the table to be positioned automatically to tolerances of plus or minus 0.0001 inch. For measurements along X and Y coordinates, series of class A measuring gages are lined up. There are four gages in even tens of inches, 10 in inches, 10 in tenths of inches and so on down to 0.0001 inch increments. The gages are selected by motor driven drum dials and positioned end to end to provide the required measurements.

Movement of the table stacks the gages and moves them to operate a switching mechanism. At the point of



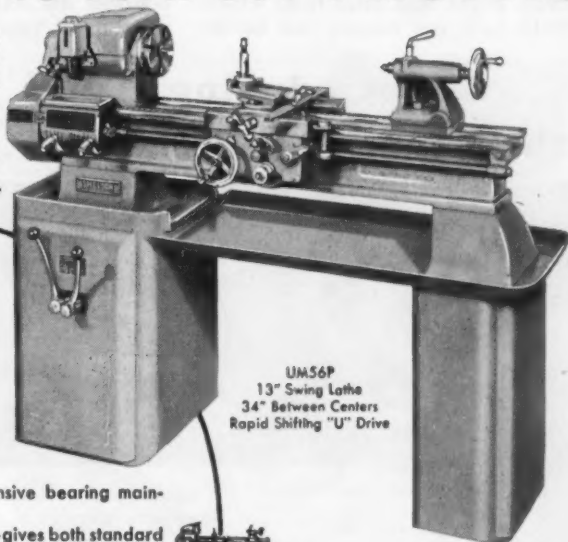
Fosmatic Tape Controlled Jig Borer in use

SHELDON

CHICAGO U. S. A.

BUILT . . . to Turn out PROFITS

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



UM56P
13" Swing Lathe
34" Between Centers
Rapid Shifting "U" Drive

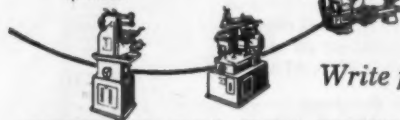
Design

Features:

- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, end expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1 3/8" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene V-belts to spindle.

OPTIONAL FEATURES AT EXTRA COST

include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.



Write for New Catalog G-55

SHELDON MACHINE CO., Inc.

4250 N. Knox Ave.

Chicago 41, Illinois

For more data circle 459 on Reader Service Card



new shop equipment . . .

final position, the table movement is stopped, the traverse screw is relieved by reversing it slightly and the table is clamped.

The Fosmatic Jig Borer Model 54P provides 16 speeds from 30 to 1,800 r.p.m. controlled by electro-magnetic clutches. Eight feed rates from 0.0005 to 0.010 inch per minute can be se-

lected. Table size is 54 by 22 inches. Table to spindle capacity is 27½ inches.

For more data circle 96 on Reader Service Card

★ ★ ★

MULTI-DUTY LUBRICANT

Vanguard Solid Lubricants, Inc., New York 21, N. Y., recently announced its Molyglyde, which is a multi-duty lubricant that will give

long positive protection. It is a stable, waterproof, non-melting grease incorporating molybdenum disulfide, with unusual adhesion qualities. It is claimed to stand unusual bearing and shock loads, assure long lasting, trouble free and economical performance. It may be applied to any lubrication point of autos, trucks, marine motors and so on. For more data circle 97 on Reader Service Card

Introducing the new FEDERAL "55"



Ram Area—11½" x 24" to 36"
Shut Height—12½" to 33½"
Throat Height—15" or 17"
Bolster Area—36" x 28"

Handles work
formerly confined
to larger, more
costly presses!

A great press—just check its dimensions! The "55" is outstanding for other reasons, too. Rugged. Precision-built. With the many extra quality features that have made FEDERAL PRESSES famous the world over. Available in geared or flywheel models, with mechanical or air clutch. WRITE FOR NEW CATALOG.

No. 55 Flywheel type
56-ton capacity

Federal Press Company
704 Division St., Elkhart, Ind.

FEDERAL *Open back
Inclinable* **PRESSES**

32 Years of Quality Construction

For more data circle 460 on Reader Service Card

203 modern machine shop



Molyglyde Lubricant

August, 1957

M & M develops another specialized machine

New automatic inline transfer machine

handles 650 pistons per hour at 100% efficiency

Pistons are delivered to the first station of machine by a conveyor. They are picked off this conveyor, loaded into the machine, processed and delivered to another conveyor . . . all automatically. Here is the sequence of operations performed:

Station 1—Accept and unload piston from conveyor chute.

Station 2—Orient piston in relation to pin bores and bosses, using an electric eye and orientating table.

Station 3—Push piston down against positive locator by means of hydraulic expanding lug. Drill center of dome end and spot face two sections from the bottom upwards.

Station 4—Mill weight pads.

Station 5—Spot drill drive holes in weight pads.

Station 6—Drill drive holes in weight pads.

Station 7—Ream drive holes in weight pads.

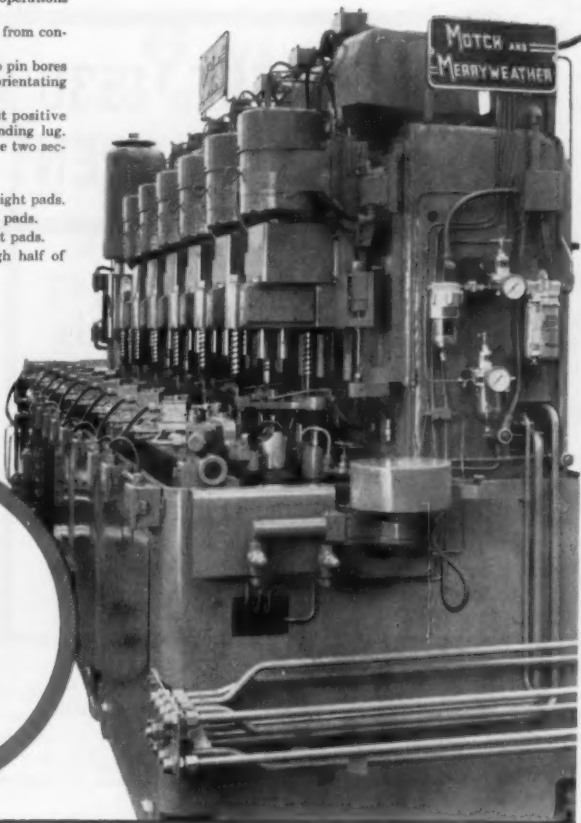
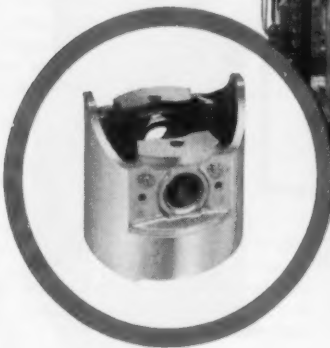
Station 8—Drill two oil holes through half of pin boss.

Station 9—Drill two oil holes half-way through other half of pin boss.

Station 10—Drill two oil holes completely through other half of pin boss.

Station 11—Dump chips and unload to conveyor.

Always consult M & M first for all types of specialized machine tools.



The **MOTCH & MERRYWEATHER MACHINERY** *Company*

MACHINE TOOL MFG. DIVISION
CLEVELAND, OHIO

For more data circle 461 on Reader Service Card

August, 1957

modern machine shop 209

new shop equipment . . .

TRUNNION TRANSFER MACHINE

Zagar, Inc., 23898 Lakeland Blvd., Cleveland 23, Ohio, has announced a versatile trunnion transfer machine. Simultaneous multi-hole drilling and reaming from three sides are featured in this machine, in addition to tapping. The piece processed is a rectangular, bar shaped lawn mower part.

At the first station, a single hole is drilled in each end of the part. At station two, the drilled holes in the ends are reamed simultaneously with the drilling of eight holes on the flat side of the part. The eight holes are drilled by a multiple spindle drill head, located at the rear of the machine. At the third station, the eight holes drilled at station two are tapped by a drill head found at the front-top position of the machine. At station four, loading and unloading are performed.



**"BEST \$1530 WE
EVER SPENT!"**

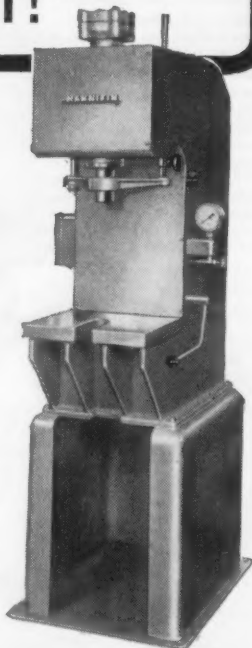
That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

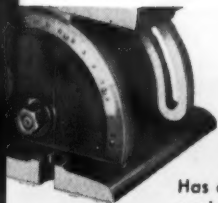
*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



HANNIFIN

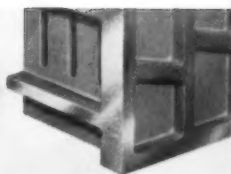
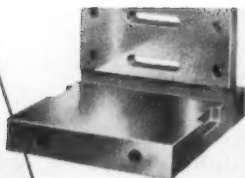
Hannifin Corporation, 565 S. Wolf Road, Des Plaines, Illinois

For more data circle 462 on Reader Service Card



Toolmaker's Adjustable Knee

Has almost 1001 uses for mounting small work during inspection, layout and machining. Low price, extreme accuracy: sides and face square to within .0001". Angular setting to within 5 minutes by Vernier Scale, 30 seconds by use of built-in sine studs.

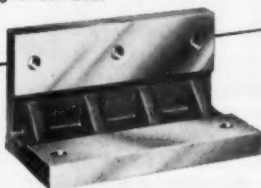
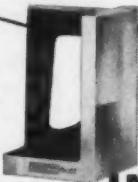


Multiplex Angle Irons

Save time by permitting a single setup of workpiece for many machining and inspection operations. All working surfaces scraped square within .0005" in 6", parallel within .0005".

Universal Right Angle Iron

Sh ground on all work-surfaces, sides and top ground square and parallel to within .0002". Can be set on any side or edge. Four sizes: 5" to 16" largest surface.

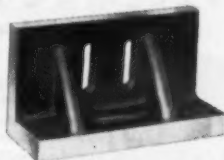
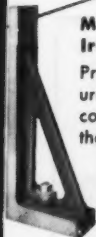


Duplex Angle Irons

Polished inner pads increase accuracy, speed setup work on planers, boring mills, shapers and drill presses. Inner pads parallel to sides within .0005". Outer faces square within .0005" in 6".

Measuring Irons

Provide a fixed surface for measurements. Narrow width makes it convenient for clamping work on the machine table. Front face and bottom finished square within .0002" per foot.

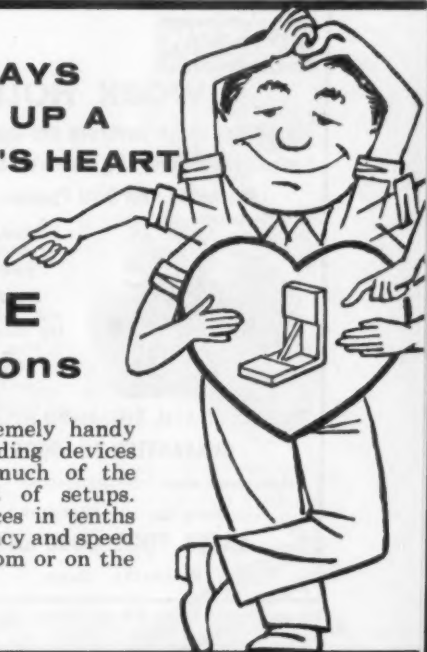


Slotted Angle Irons

Eight different sizes to give variety of combinations of height and width to handle diversity of work. Working faces ground square to within .0005" in 6". Special sizes and hand scraped surfaces on request.

6 WAYS TO SET UP A MACHINIST'S HEART ... WITH TAFT- PEIRCE Angle Irons

Here is an extremely handy line of workholding devices that can take much of the "trickiness" out of setups. You get tolerances in tenths to increase accuracy and speed — in the tool room or on the production line.



Check the complete line.

Send for listing of all models with prices.

For everything in precision toolroom specialties

TAKE IT TO TAFT-PEIRCE

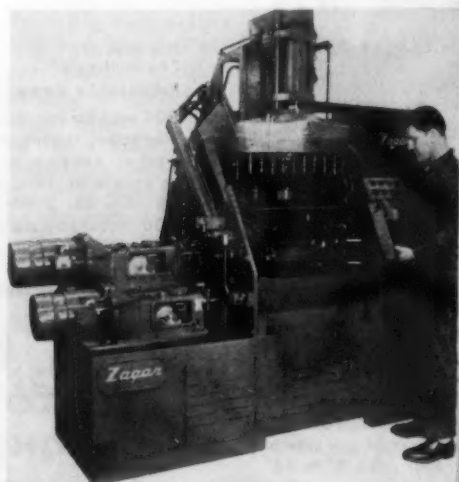
TAFT-PEIRCE MANUFACTURING COMPANY
WOONSOCKET, RHODE ISLAND



measuring
TOP

new shop equipment . . .

Multi-hole drilling, reaming and tapping are done by the company's multi-spindle gearless heads, fed by Zagar Hydraulic Feed Units. The single spindle drilling and reaming are done by Zagar Mechanical Drilling Units, located on either side of the



Zagar Versatile Trunnion Transfer Machine

machine. Machine cycling is fully automatic and electrically interlocked. The tooling is adjustable for parts ranging in length from 12 to 24 inches. For more data circle 98 on Reader Service Card

★ ★ ★

AUTOMATIC MARKING MACHINE FOR AUTOMATED PRODUCTION

New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Mich., has designed and built a machine that marks

LASSY

WORK HOLDER

Provides quick accurate set-ups on
Lathes, Grinders, Jig Borers, Milling
Machines and Drill Presses.



Model R
Shown
\$49.00

Model P
with quick acting
swing clamp
is ideal for production
\$67.00

**RUGGED DESIGN, SUSTAINED ACCURACY
GUARANTEED TO .0005**

Hardened steel interchangeable inserts.

Write for free literature.

LASSY TOOL COMPANY
Plainville, Conn.

For more data circle 464 on Reader Service Card



SPELLMACO 'SPOTTERS'

A matched set of transfer punches
for toolmakers, machinists and tool cribs
Used for transferring location of threaded, drilled
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{3}{32}$ " to $\frac{1}{2}$ ", by $\frac{1}{4}$ "—plus handy $\frac{17}{32}$ " size. Length $4\frac{1}{8}$ ". ONLY \$17.90.
Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

For more data circle 465 on Reader Service Card

for everything in precision
toolroom specialties

"Ten Times More Hits



Since we standardized on **LAMINA GUIDE PINS and BUSHINGS**

"We have increased our hits between grinds on high speed precision dies up to ten times more than we previously had since we standardized on Lamina Guide Pins and Bronze-Plated Bushings." And that, as quoted from a user letter, is just one reason why it pays to specify Lamina as your standard, too.

You'll find, in addition, that Lamina Guide Pins and Bushings prolong die life, improve quality control, reduce downtime and cut costs . . . because the special tool steel of Lamina Guide Pins is uniformly heat treated, spray quenched and precision ground to resist wear, bending, "mushrooming" . . . and because Lamina Bronze-Plated Wring-Fit Bushings are strain relieved and pre-finished on the I.D. to assure distortion-free smooth operation, proper lubrication, positive alignment. What's more, there's a Lamina Guide Pin and Bushing for every die set need.

SPECIAL PINS AND BRONZE-PLATED BUSHINGS for any application . . . tailored to your requirements. Send prints for prompt quotation.



WRITE NOW FOR NEW 40-PAGE
CATALOG SHOWING ENTIRE LINE!



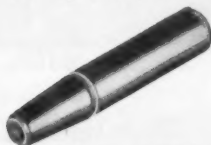
LONG SHOULDER TYPE—
Large clamp. Bearing surface
contains pin during entire
stroke. 2" to 3" pin diameter.



SHORT SHOULDER TYPE—
For die space, more bearing
space within die area, 7
lines, pin sizes 3/4" to 2".



NUT TYPE—For wide range
of general purpose require-
ments. Available in 5 sizes,
1" to 2" pin diameters.



REMOVABLE TYPE PIN
—Designed for use
wherever pin removal
is necessary. Offered in
diameters from 1" to 3".

Lamina
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN

For more data circle 466 on Reader Service Card

new shop equipment . . .

consecutive serial numbers on engine cylinder blocks. This number identifies each block with its corresponding bore size so that the subsequent operations and assembly might be successfully coordinated.

In the application shown in the accompanying illustration the machine will consecutively and automatically

mark from one to four digit numbers 5/16 inch in size to a depth of 1/64 inch at a production rate of 968 parts per hour. In other designs, marking capacity of the machine can range from one to 10 digit numbers. Marking speed of the machine can also meet any automated production requirement. Variable marking depths, ranging from a kiss impression to as deep as 1/32 inch, may be maintained and controlled within plus or minus

0.001 inch. In some cases, deeper impressions are important to prevent marking obliteration when further machining operations (such as grinding) are required.

Special marking head units are powered by air cylinders. Downward movement is controlled by a toggle arrangement that operates under the mathematical sine law principle. As a marking head advances toward the part within a fraction of an inch of the marking surface, air is supplied to cylinders that provide an oscillating or rocking motion to the marking head. This rocking motion continues as the head advances into the material, thus rolling in the impression. Since only a



Polishing shaft bearing surface
with Schauer Type NA2C Speed Lathe.

These versatile, low-cost machines handle an almost unlimited variety of work — deburring, lapping, trimming, polishing—on metal and plastic parts. Thousands in use. Many sizes and models with holding devices to suit the job. *Speed production* with Schauer Speed Lathes. Write for Catalog No. 530.

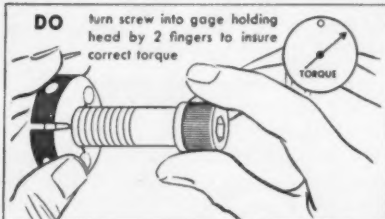
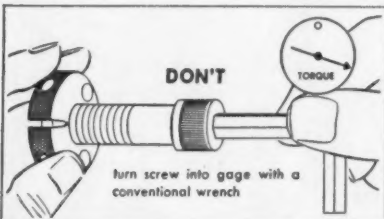
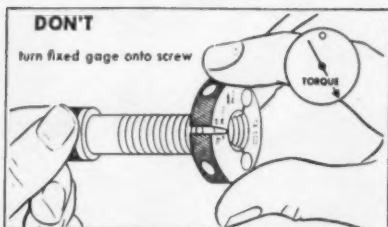
Our 50th Year

SCHAUER MANUFACTURING CORP.

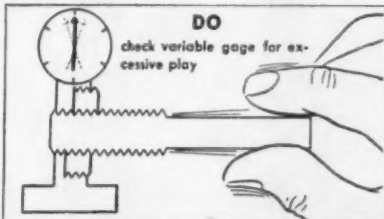
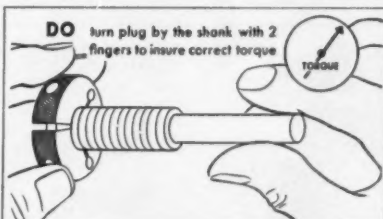
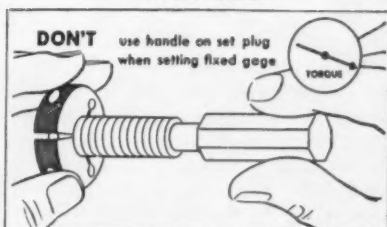
4501 Alpine Ave. • Cincinnati 42, Ohio

For more data circle 467 on Reader Service Card

When measuring high limits



When gaging gages



These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them—new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits no

matter what method is used to gage them. Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.



Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for your free copy today.

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS
JENKINTOWN PENNSYLVANIA

For more data circle 468 on Reader Service Card

new shop equipment . . .

relatively small area of the total impression is being marked at a given instant, the required marking pressure is considerably less than for a continuous area contact. This oscillating principle is claimed to enable thin wall sections to be marked without crack-

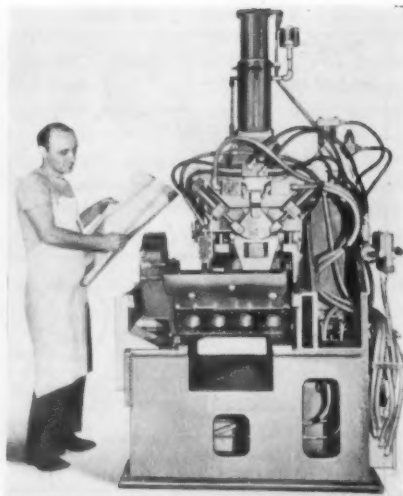
GRANT RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 5, Conn.

For more data circle 469 on Reader Service Card

**New Method Automatic Marking Machine**

ing, while increasing longevity of the marking die and all of the machine components.

Variations of the machine illustrated can be designed to automatically mark any production part whether it has a flat, angular or irregular surface.

For more data circle 99 on Reader Service Card

★ ★ ★

BALL BEARING CHUCK

Supreme Products Corp., 2222 South Calumet Ave., Chicago 16, Ill., has in-

*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS



Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.

HEIMANN MFG. CO. • URBANA, OHIO

For more data circle 470 on Reader Service Card

INVEST JUST 12 PENNIES A DAY

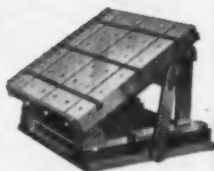


TO SAVE DOLLARS THE *Robbins* WAY

Robbins angular tooling equipment often pays for itself the first few times you use it . . . but let's be conservative. Let's talk about writing off the cost over ten years. (About half the useful life of a "Magna-Sine!") Written off in this manner, the Model A-5 Magna-Sine illustrated represents an investment of around twelve cents a day!

This equipment saves dollars of valuable toolroom time on every job. Set-ups that require *hours* by other methods take just *minutes* the Robbins way. Set up to machine, grind or inspect any angle in just four simple steps: (1) Look up required angle in Table of Constants furnished with unit, (2) Select gage blocks indicated, (3) Place blocks between base and sine bar swivel block, (4) Secure the work . . . and you're ready to go!

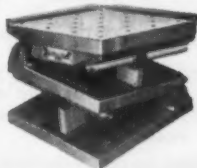
This simple, fast, sure method sets up any angle, single or compound, right or left hand, without V-blocks, angle plates or complicated "build-ups." Complete range of models and sizes puts Robbins precision equipment within the reach of every shop. Write now for literature.



HEAVY DUTY SINE PLATE
FOR MACHINING



"MAGNA-SINE" WITH
MAGNETIC TABLE



FOR INSPECTION AND
LIGHT MACHINING

OMER E.

Robbins

24800 PLYMOUTH ROAD

DEPT. B

COMPANY

DETROIT 39, MICH.

Also manufacturers of special machinery, automatic assembly machinery.

5937

For more data circle 471 on Reader Service Card

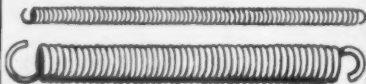
REID TOOL ROOM NEEDS!

COMPRESSION SPRING ASSORTMENT



Made from music wire. All sizes in diameters $\frac{3}{32}$ " to $1\frac{1}{2}$ ". All 10" long. Select the size required and cut to length wanted. Saves time and money.

EXTENSION SPRING ASSORTMENT

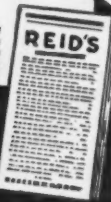


Made from music wire. All sizes in diameter $\frac{1}{8}$ " to 1". All 11" long with loop or hook at both ends. Cut to length desired.

FREE 64 PG. CAT.

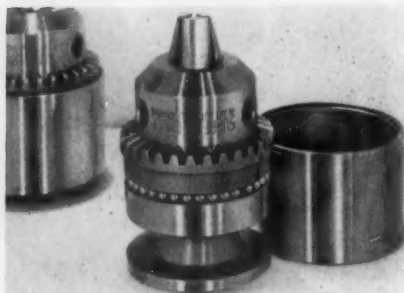
Listing numerous tool room needs such as plastic and steel ball handles, machine handles, hand wheels, hand knobs, etc.

REID
TOOL SUPPLY CO.
MUSKEGON HEIGHTS,
MICHIGAN



For more data circle 472 on Reader Service Card

new shop equipment . . .



Supreme Ball Bearing Chuck with sleeve removed, exposing the ball race. At the left is the same chuck with the sleeve in place

introduced its Series 20 Ball Bearing Geared Chuck Line. The line consists of two new gear chucks which have a friction free ball thrust bearing between the chuck body and the gear nut.

With the same key tightening effort, chucks in the Series 20 line are claimed to grip with more force than a plain bearing chuck.

In accord with the company's regular one piece construction, the ball races are formed directly in the hardened chuck body and in the one piece gear nut. Simplicity of construction and a minimum number of parts means maximum efficiency, accuracy and freedom from maintenance.

There is nothing on the smooth sleeve on which clothing or other materials can be snagged. Hands and knuckles are less apt to be hurt when the chuck is touched accidentally.

For more data circle 100 on Reader Service Card

★ ★ ★

LIVE CENTER

An economical "Spinose" Live Center has been introduced by Ideal Industries, Inc., 1031 Park Ave., Sycamore, Ill.

WALKER

and a great industry



For more than fifty years automotive production has relied on Walker holding devices. One of the most popular chucks in the Detroit area is Walker 617 CG. (concentric gap) type, a rectangular chuck that combines longitudinal and transverse gaps. Produced in sizes to meet all holding requirements.

Walker engineers can solve any holding problem.
What is yours?

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

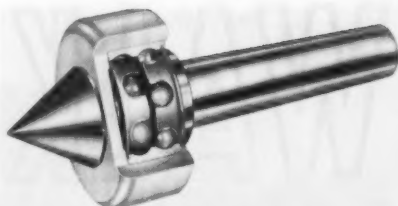
Original Designers and Builders of Magnetic Chucks

For more data circle 473 on Reader Service Card

new shop equipment . . .

more, Ill. The "Spinose" Live Center is claimed to answer many needs of maintenance shops, small machine shops and light production at a reasonable cost.

According to the manufacturer, this center has good load capacity and ac-



Ideal "Spinose" Live Center has ball bearings that handle radial and thrust loads

curacy. Twin row, angular contact pre-loaded ball bearings handle both radial and thrust loads. The bearings are completely sealed and do not require relubrication for the life of the center, which is 2,500 hours average life. The center nose (point and bearing housing) turns with the work. This live center is available in Morse tapers 1, 2 and 3. The company states that the "Spinose" Live Center is an expendable tool which is more practical to replace than repair.

For more data circle 101 on Reader Service Card

★ ★ ★

SINGLE SPINDLE THREADING MACHINE

The 5C Landmaco Single Spindle Threading Machine has recently been developed by the Landis Machine Co., Waynesboro, Pa., for the precision threading of small diameter workpieces. It will produce threads to Class



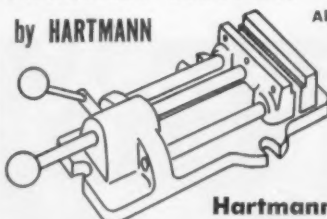
CONTINUOUS HINGES

Manufactured by
**AUTO MOULDING
& MFG. CO.**
WRITE FOR CATALOG
1114 E. 87TH ST. CHICAGO 19

For more data circle 474 on Reader Service Card

INSTANT ACTION

by **HARTMANN**

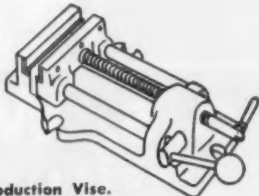


RAPIDSET

All Purpose Tool Room And
Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.
For Information Write Dept. M.



Hartmann Mfg. Co., 1637 Gould St., Racine, Wis.

For more data circle 475 on Reader Service Card



40 STYLES—OVER 200 TOOLS—
MAKE KENDEX® TOOLING ADAPTABLE
for virtually every machining job

The production-boosting, cost-cutting, job-simplifying advantages offered by the Kendex throw-away, turn-over insert principle can be adapted to practically any machining job.

Over 40 styles and over 200 Kendex tools let you make savings in boring; profiling; chamfering; odd job, step and face milling . . . on older machines as well as on the newer automatic cycling types.

Kendex tools permit quick changing of inserts without resetting the tool, eliminate costly insert and chip-breaker grinding, give better chip control, permit use of harder grades like Kennametal K7H along with many other grades in inserts of various sizes and shapes

©Kennametal

to give best results on any specific job. Many of the tool styles offer a choice of positive or negative rake which accommodate either regular or precision ground inserts. Kendex offers the most advanced and complete line of metalworking tools available today.

The pictures above merely suggest the many tools in which the Kendex principle is available. Your Kennametal Tool Engineer will help you apply Kendex tools to your operations. He works exclusively with Kennametal tooling . . . applying and servicing it . . . working with production men in mapping the best solutions to tough machining problems. Give him a call or write KENNAMETAL INC., Latrobe, Pennsylvania.

C-3009



INDUSTRY AND
KENNAMETAL
... Partners in Progress



For more data circle 476 on Reader Service Card

new shop equipment . . .

3 and 4 tolerances on a production basis and has a No. 4 to $\frac{5}{8}$ inch range.

The 5C Machine can be furnished with or without lead screw feed. It is equipped with a 5VVV Lanco Hardened and Ground Die Head, which features maximum rigidity derived from fundamental design and the inherent qualities of properly selected

and hardened material. The head is equipped with Landis Tangential Chasers, which are claimed to provide long life between grinds and can be ground for 80 per cent of their original length. An air operated carriage front, air operated carriage return, automatic or manual work stop and a special carriage fronts for holding difficult to grip workpieces can be supplied. To promote long life and rigid construction, the headstock is of

heavy cross section and is integral with the bed. Precision shaved hardened alloy steel headstock gears assure accuracy, quiet operation and unusual wearing qualities. The heat treated spindle is mounted on preloaded anti-friction bearings front and rear.

Eight spindle speeds, ranging from 150 to 1,000 r.p.m., are provided by a geared headstock and four step cone vee belt pulley drives. Higher or lower speeds are available for special use. To enable rapid speed changes, a HI-LO shift mechanism is used. Through this mechanism, each step of the cone pulley delivers two spindle speeds.

The machine bed is of smooth,



SAVE PRODUCTION COSTS WITH . . .



quadrill

4 POSITION DRILLING & TAPPING TURRET HEAD

Holds four drills or cutting tools. One tool only operates when head is in operating position. Drills to full capacity of drill press. Send for complete information today. Be sure to specify size and make of drill press when ordering QUADRILL.

CHICAGO QUADRILL
Company

1854 BUSSE HIGHWAY • DES PLAINES, ILL.

For more data circle 477 on Reader Service Card

OSBORN BRUSHING METHODS worthy of your confidence

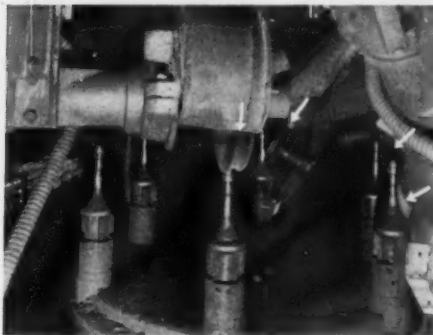
6-second finish



THE efficient job performance demanded of these cylindrical steel cams requires the proper finishing of their many surfaces. Power brushing proved to be the most effective method for removing the sharp edges and small burrs.

In the operation shown below, Osborn Power Brushes mounted on an automatic rotary machine remove minute burrs and blend surface junctures. This is done on a 6-second cycle . . . quickly, accurately and economically.


An Osborn Brushing Analysis, made in your plant at no obligation, may point the way for improvements in your operations. Write *The Osborn Manufacturing Company, Dept. B-12, Cleveland 14, Ohio.*



Four Osborn Monitor® Brushes remove burrs and produce accurately finished parts.

Write TODAY for
the new
100-page Osborn
Catalog 210-C

Osborn Brushes



BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES
For more data circle 478 on Reader Service Card

August, 1957

modern machine shop 223

4 Reasons why you should use

GAMMONS DIE REAMERS



Specially treated for today's modern die steels.



Rapid cutting capacity.



Tapers per inch .005, —.008, —.013 in stock.



Large range of standard sizes in stock at all times for your convenience.

WRITE FOR COMPLETE INFORMATION

GAMMONS • HOAGLUND CO.

MANCHESTER 2, CONN.
Manufacturers of helical taper pins, chucking,
die makers and special reamers.

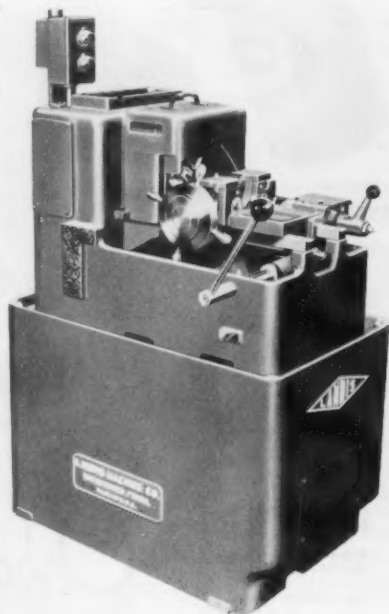
For more data circle 479 on Reader Service Card

224 modern machine shop

new shop equipment . . .

sturdy construction for operating comfort. Replaceable hardened and ground ways with ample bearing surfaces assure accurate carriage alignment and minimize wear.

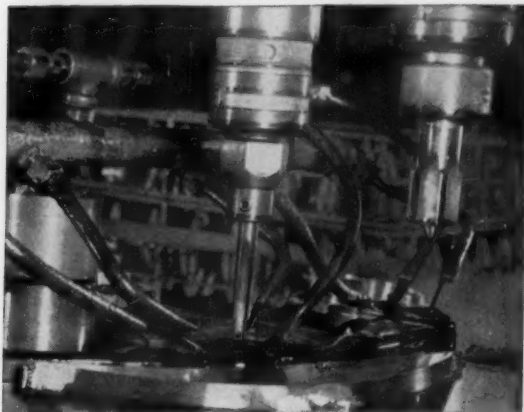
The carriage, operated by lever in conjunction with a toggle link, has a nominal 4½ inch travel. However, total available thread length varies slightly with the carriage front, die head chaser holders and auxiliary equipment supplied. To intensify gripping power without operator fatigue, the carriage front or vise is operated by a hammer blow type handwheel. The front is adjustable both horizontally and vertically to assure precise work alignment with the die head. A lead screw is recommended where



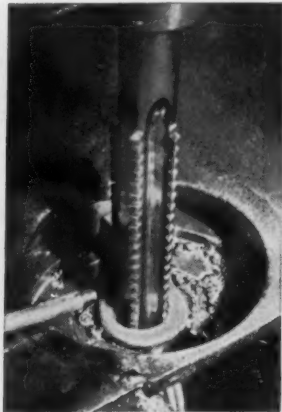
Landmaco Single Spindle Threading Machine

August, 1957

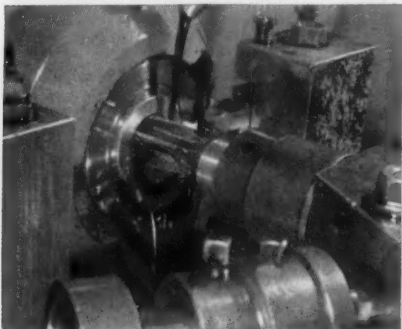
Cutting Tool and Gaging Methods...by **BESLY**



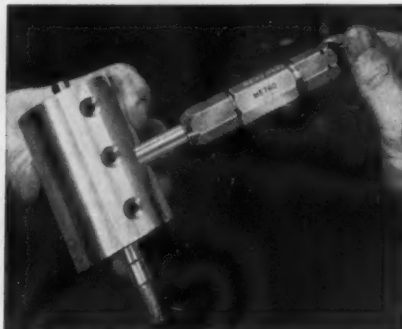
MATCHED TO THE JOB—At The Chicago Screw Company, Bellwood, Illinois, two sizes of Besly taps, poised above an indexing table, are ready to tap C-1141 steel parts. Operating alternately, the smaller $\frac{3}{8}$ "-24 Besly tap quickly threads a hole, then the work indexes beneath the $1\frac{1}{2}$ "-24 Besly tap and a larger hole is threaded.



SQUARED OFF—Templeton, Kenly & Company, Broadview, Ill. cuts heavy, almost square threads in bases of 12 to 24-ton screw jacks with Besly acme thread form taps.



TOUGH GOING—Here you see a C-1018 high carbon steel nut being threaded by a Besly $1\frac{1}{4}$ " tap. Extremely abrasive carburized and heat treated material is difficult to tap. However, Besly taps proved they could "take it".



ASSURED ACCURACY—To assure that holes in planer cutter head assemblies provide precise fits for set screws, SKIL Corporation, Chicago, checks for accuracy with Besly-Metro Double End Reversible Cylindrical Plug Gages.

Prove to yourself that Besly Cutting Tools and Gages produce better results. Put them on trial on your toughest jobs, and check the difference in longer tool life, less down time, fewer rejects and faster production. If you'd like to try Besly tools or use Besly's Engineering Service, see your Besly distributor for details, or write us...

Engineering, Service and "Specials"... are a Besly Specialty



BESLY-WELLES
CORPORATION

Est. as C. H. Besly & Co. 1875

108 Dearborn Ave., South Beloit, Illinois

TAPS • DRILLS • REAMERS • END MILLS • TOOL BITS • GAGES
CARBIDE TIPPED TOOLS, BLANKS, THROWAWAY INSERTS and HOLDERS

For more data circle 480 on Reader Service Card

August, 1957

modern machine shop 225

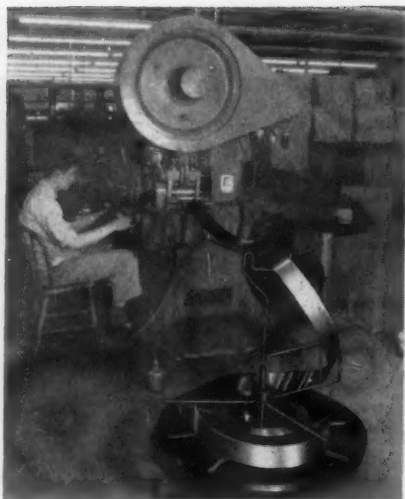
new shop equipment . . .

maximum thread accuracy and close lead tolerances are to be maintained. Precision ground from heat treated alloy steel, the lead screw is nitrided for wear resistance. Also, it is reversible end for end to provide maximum life. For more data circle 102 on Reader Service Card

★ ★ ★

AUTOMATIC STOCK REEL IS IMPROVED

Jaco Devices, Inc., 98 High St., Hingham, Mass., has announced that several improvements have been incorporated into its automatic stock reel. Among these are a heavier base casting and platen which have increased the capacity of the stock reel to carry coils of material up to 300 pounds in weight on each model. The solid



Jaco Improved Automatic Stock Reel in use

platen permits application of cutting lubricant to the stock as it lies on the

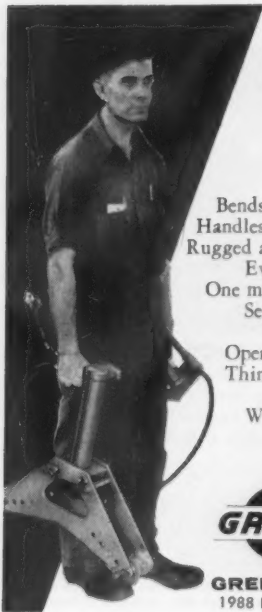
★ ★ ★ ★ ★

faster, lightweight

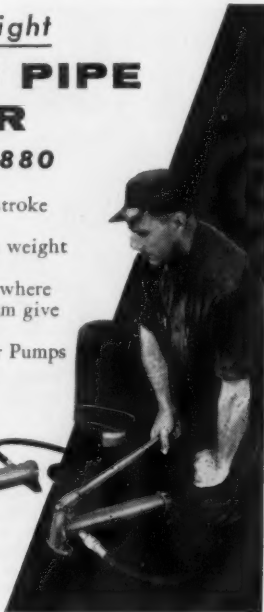
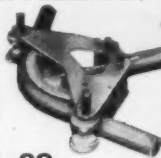
HYDRAULIC PIPE BENDER

GREENLEE NO. 880

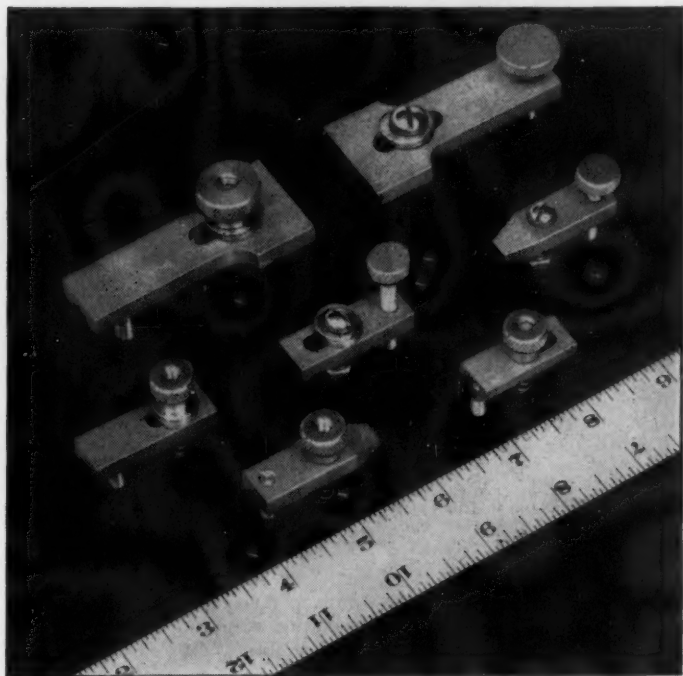
Bends pipe or conduit 90° with one ram stroke
Handles 1/2-in. to 2-in. pipe or conduit
Rugged aluminum alloy construction slashes weight
Every bend perfectly uniform
One man easily carries and operates it anywhere
Separate two-speed hand pump and ram give faster handling and setup
Operates with fast GREENLEE 798 Power Pumps
Thin-wall conduit, tubing, and bus bar attachments available
Write for illustrated Bulletin E-217



GREENLEE TOOL CO.
1988 Herbert Ave., Rockford, Ill.



LODDING'S LITTLE FELLOWS



The Lodding line of stainless steel fixture components and clamp assemblies is complete and ready for you at your nearest Lodding warehouse. Carefully designed and made for essential holding in miniature operations . . .

- Chisel Point Assembly . . .
- Wide Clamp Assembly . . .
- Knob Assembly . . .
- Thumb Screw Assembly . . .

LODDING, INC. WORCESTER 1, MASS.

Precision Tool Sales
417 E. Florence Ave.
Los Angeles 3, Calif.

← FACTORY WAREHOUSES →

Bagby Engineering Co.
1047 Forest Ave.
Evanston, Ill.

For more data circle 482 on Reader Service Card

MESSAGE from the "NO" men of Laminated Shim Company

You lose **NO** time when you use
LAMINUM SHIMS...

NO machining!



NO grinding!



NO counting!



NO stacking!



NO miking!



...and **NO** dirt between layers—ever!

LAMINATED SHIMS OF



STAINLESS STEEL with laminations of .002" or .003"	LOW CARBON STEEL with laminations of .002" or .003"
BRASS with laminations of .002" or .003"	ALUMINUM with laminations of .003" only

LAMINATED SHIM COMPANY, INC.

Shim Headquarters since 1917

3308 Union Street, Glenbrook, Conn.

For more data circle 483 on Reader Service Card

228 modern machine shop

now shop equipment . . .

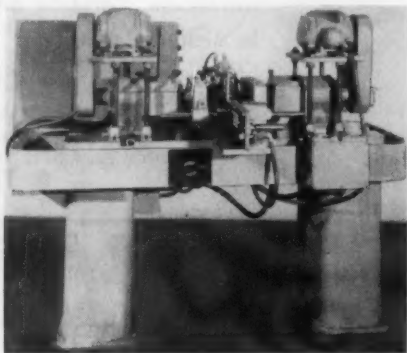
platen, rather than application by stock oiler to the uncoiled stock. The coil is simply laid on the platen; it need not be centered and there is no danger of the reel tipping because the coils lie flat and close to the floor. The natural spring of the stock rotates the platen, automatically uncoiling the stock without attention or maintenance. The loop of stock eliminates feed slippage, kickback or over run. The feed is kept supplied with stock at whatever speed the press is running. The heavier base and solid steel platen are now supplied on all models of the Jaco Automatic Stock Reels.

For more data circle 103 on Reader Service Card

★ ★ ★

SPECIAL MACHINE TAPS 28,800 HOLES PER HOUR

Ettco Tool and Machine Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y., has developed a special machine to tap 6/32 inch holes (7/16 inch center to center) in either of two different types of brass terminal inserts set in phenol fibre—40 holes in one part and 20 in the other—and to produce 720 com-



View of Ettco-Emrick Special Tapping Machine

August, 1957



**THERE'S A NEARBY
LEHMANN-FULTON ENGINEER
TO GIVE YOU FREE TECHNICAL HELP**

BLOCKS,
BARS AND CUTTERS—
STANDARD AND CUSTOM
MADE—IN ALL TYPES
AND SIZES



Our factory-trained engineers are all over the map. Any of them will help solve your tooling problem . . . by mail, phone or in person.

Have them show you how Lehmann-Fulton hardened block type boring tools cut costs and increase production in ALL your boring operations.

Write today for the name and address of our nearest representative. We'll also send you our free Catalog BT57 full of valuable technical data. No obligation, of course.

LEHMANN BORING TOOL

DIVISION OF FULTON IRON WORKS COMPANY
4235 DUNCAN AVE., ST. LOUIS 10, MO.

For more data circle 484 on Reader Service Card

new shop equipment . . .

pleted parts every hour. This special is a basic two way horizontal automatic lead screw tapping machine which includes a vacuum mist lubrication and disposal system. This special machine is capable of producing either part at the required production rate. Quoted at 100 per cent efficiency,

a completed part is produced at each stroke of the machine or 28,800 holes tapped per hour.

Parts of either type are hand located vertically into a track and pushed forward into work position by means of a hand actuated fixture. When the part is in position, two synchronized horizontal A. T. U. No. 3 lead screw tapping units are actuated. These units, each of which is set up with a 20 spindle multiple head, also

have pickup rods and a safety device to assure error proof positioning of the parts—a feature that is said to eliminate spoilage and the possibility of tap breakage.

As each part is progressively fed through the two work stations, one completely tapped part, free from oil or chips, is automatically ejected into the tote box. It is because the parts must be dry that mist fed lubrication is used in this application.

An advantage of this machine is that after the run is completed, a great many of the components, such as the lead screw tapping machine, cast iron base, wiring system and so on can be used again.

For more data circle 104 on Reader Service Card



YES, A SEVERANCE MIDGET MILL MAY WELL SOLVE YOUR PROBLEM AND SAVE YOU MONEY, IF YOU MUST REMOVE GATES, FINS, AND RISERS; BREAK SHARP CORNERS AND EDGES; MACHINE CARBON; FINISH CASTINGS OF ANY MATERIAL; WORK FILLETS, RADI, AND GROOVES; DEBURR OIL HOLES; BLEND WELDED AND ASSEMBLED PARTS; REMOVE FLASH; SMOOTH WELD BEADS; OR ANY OTHER SIMILAR OPERATIONS



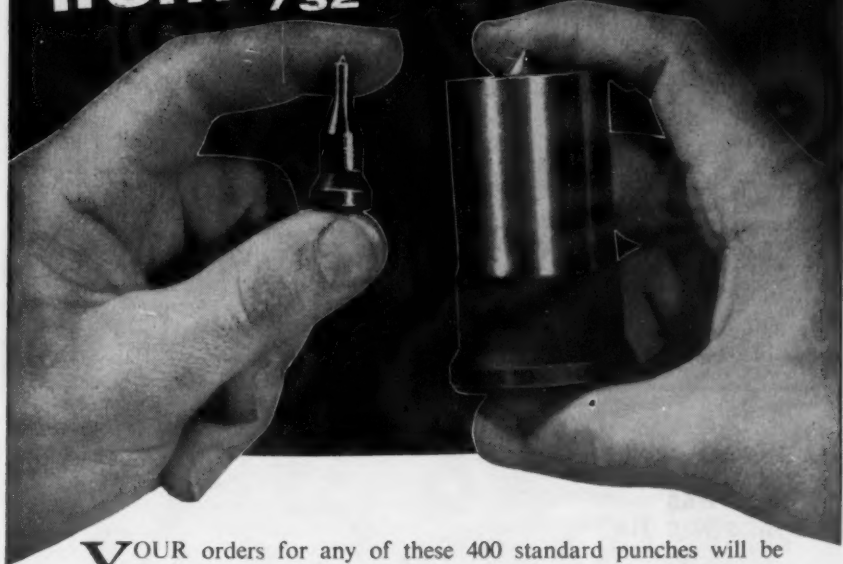
SEVERANCE MIDGET MILL SET NO. 77 IS A POPULAR SET OF 1/2" DIAMETER, 1/4" SHANK, HIGH SPEED MIDGET MILLS. MAKES A FINE GET-ACQUAINTED-SET AND WILL COVER A BIG MAJORITY OF YOUR NEEDS FOR THIS TYPE TOOL. LEAFLET NO. 651 GIVES DETAILED INFORMATION AND PRICES. **ASK FOR IT TODAY!**

Severance TOOL INDUSTRIES INC.
724 Iowa St. • Saginaw, Michigan



For more data circle 485 on Reader Service Card

400 Standard Cleveland Punches from $\frac{5}{32}$ " to $1\frac{1}{2}$ "



YOUR orders for any of these 400 standard punches will be filled promptly from stock. Naturally they cost less than special punches. What's more, when you order Cleveland punches you're sure of getting quality tools backed by years of specialized experience. We're constantly experimenting with various steels and processes so that we can give you the very best.

Are your punching machines equipped to use standard Cleveland punches? If not, it will pay you to investigate the many advantages of standardization. For detailed information send for our new Catalog No. 12 today!



A-9223



Established 1880

POWER PRESSES — FABRICATING TOOLS

City Foundry Division • Small Tool Department

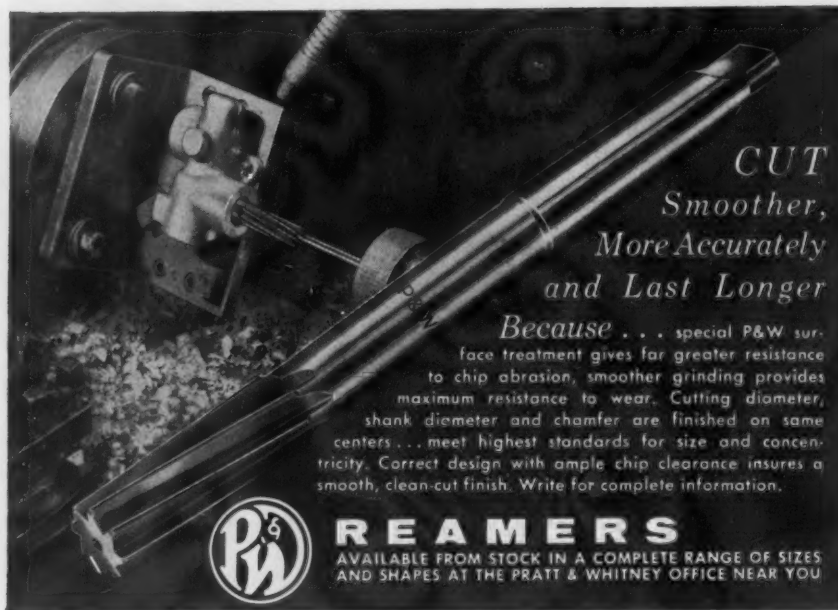
E. 40th & St. Clair Avenue • Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING

For more data circle 486 on Reader Service Card

August, 1957

modern machine shop 231



CUT
Smoother,
More Accurately
and Last Longer

Because . . . special P&W surface treatment gives far greater resistance to chip abrasion, smoother grinding provides maximum resistance to wear. Cutting diameter, shank diameter and chamfer are finished on same centers . . . meet highest standards for size and concentricity. Correct design with ample chip clearance insures a smooth, clean-cut finish. Write for complete information.

REAMERS
AVAILABLE FROM STOCK IN A COMPLETE RANGE OF SIZES AND SHAPES AT THE PRATT & WHITNEY OFFICE NEAR YOU

P&W

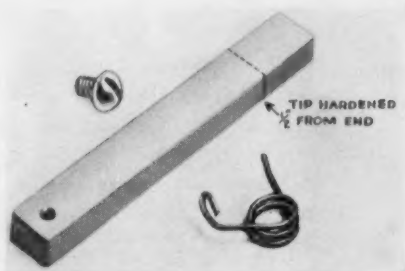
For more data circle 487 on Reader Service Card

★ ★ ★ ★ ★

DIE STOP HAS PREHARDENED TIP

A completely modern primary die stop has been added to its line of die stops by the Keystone Engineering and Manufacturing Co., 122 Southwest 16th St., Des Moines, Iowa. Known as the Keystone Primary Die Stop, the unit has been designed to eliminate time that is wasted by diemakers because of the need for making a careful precision primary die stop installation and then hardening the tip.

The Keystone Primary Die Stop has a prehardened tip and is claimed to be so simple to install that an apprentice diemaker can handle the job with ease. There are no precision holes to be drilled in accurate locations. The actuating spring also serves as a retainer for both directions of



Keystone Primary Die Stop has prehardened tip

movement. The time consuming heat treating operation is eliminated because the Keystone Primary Die Stop tip is hardened $\frac{1}{2}$ inch from the end and there is no need to cut the end in order to modify the stop to the desired length.

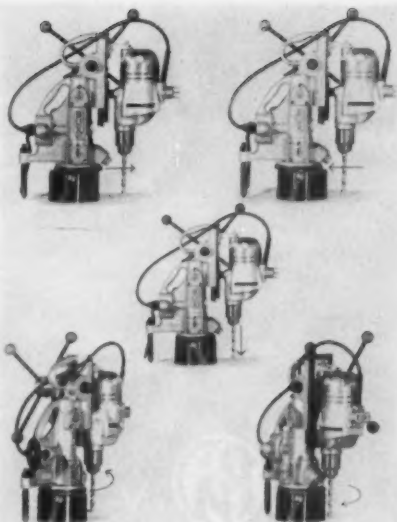
For more data circle 105 on Reader Service Card

MECHANICAL RADIAL POSITIONER

Buck Manufacturing Co., 1355 North 10th St., San Jose, Calif., has announced a mechanical action drill positioning device which has been designed into Bux Portable Magnetic Drill Press Units to provide freedom to rotate the drill point a full 330 degrees for accurate positioning, after the magnetic base has been turned on and is gripping the drill unit to the workpiece.

A simple $\frac{1}{4}$ turn of the positioner locking handle frees the drill post for radial turning up to 300 degrees, or for lateral movement, to guarantee precision alignment of the unit for drilling, reaming and tapping.

Besides increasing the accuracy of the portable magnetic drill press units, this radial positioner increases safety performance. The powerful electromagnetic base is on full force at all



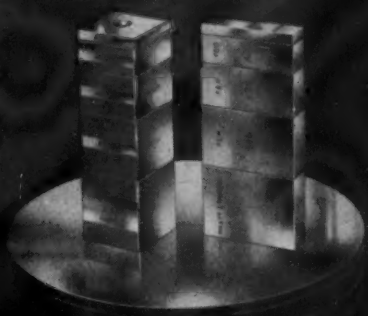
Bux Mechanical Radial Positioner permits drill point to rotate a full 330 degrees

★ ★ ★ ★ ★

\pm Millionths!

HOKE[®] USA

Precision in production demands dependably accurate basic standards of measurement. To establish and maintain these standards, there is no surer means than Pratt & Whitney Precision Gage Blocks . . . produced by the company that established the first accurate inch in American industry. P&W Gage Blocks are available: in HOKE (square type) or USA (rectangular type), Steel or Solid Carbide, Single Blocks or Complete Sets. Write for Circular 545-2, Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Connecticut.



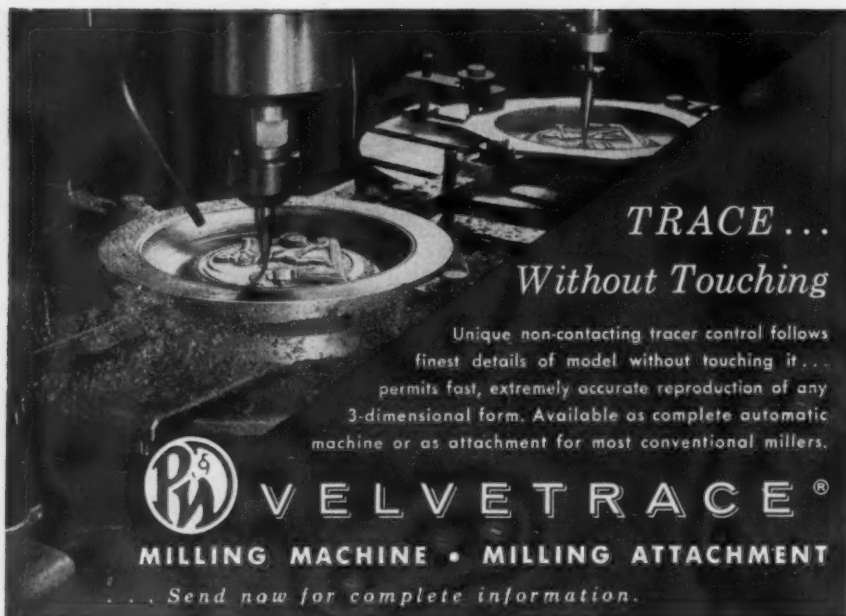
PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 488 on Reader Service Card

August, 1957

modern machine shop 233



TRACE...
Without Touching

Unique non-contacting tracer control follows finest details of model without touching it... permits fast, extremely accurate reproduction of any 3-dimensional form. Available as complete automatic machine or as attachment for most conventional millers.

VELVETRACE®
MILLING MACHINE • MILLING ATTACHMENT

Send now for complete information.

For more data circle 489 on Reader Service Card

★ ★ ★ ★ ★

new shop equipment . . .

times to safely hold the drill press to the work, eliminating the possibility of operators losing control of the unit while positioning.

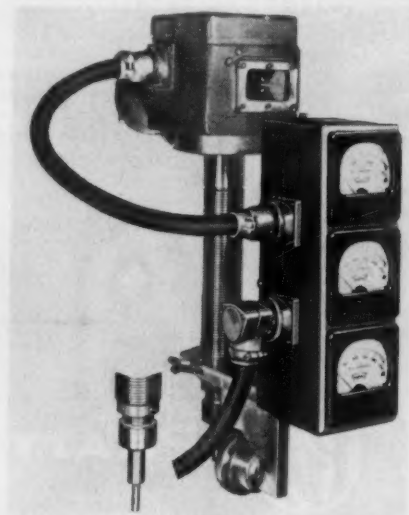
The positive acting mechanical design of the positioner provides simple, rugged construction. This Bux Radial Positioner is available on all models of the company's portable magnetic drill press units at optional extra cost.

For more data circle 106 on Reader Service Card

★ ★ ★

VISUAL INDICATOR SETUP ATTACHMENT

Tracer Control Co., 595 East Ten Mile Rd., Hazel Park, Mich., has announced a visual indicator set-up at-



Tracer Control Indicator Set-Up Attachment

tachment. The attachment mounts on the tracer unit head and gives the set-up man individual visual reading on each of the three movements of the stylus, speeding set-up and assuring accuracy. Meter calibrations are in milliamps. The unit may be installed on the Duplimatics now in the field, as well as specified on new machines. For more data circle 107 on Reader Service Card

★ ★ ★

NIBBLING MACHINE

W. J. Savage Co., Knoxville, Tenn., is marketing a line of nibbling machines. Savage Nibbling Machines are built in two types—the roller die and nibbler types—and in nine sizes. They are suitable for cutting by template or to a scribed line. The one piece revolving head, which is totally enclosed, means fewer parts and a long life. The tools and dies may be sharpened numerous times. Savage Nibbling Ma-



Savage No. 3 Roller Die Type Nibbler in use

chines have been designed for fast and accurate cutting of sheet metal up to $\frac{3}{4}$ inch thick. These machines cut brass, copper, aluminum and other non-ferrous metals. They cut stainless steel to one half rated capacities in soft steel.

For more data circle 108 on Reader Service Card

★ ★ ★ ★ ★



MILLING CUTTERS

*A Complete Line of the
Highest Quality*

Whatever your needs, you can get the right standard or special milling cutters to do the job better from one convenient source . . . Pratt & Whitney. Like all other P&W Cutting Tools, you can be sure they'll cost you less in the long run . . . because they run longer! Write now for complete information. Pratt &

Whitney Company, Inc., 25
Charter Oak Boulevard,
West Hartford, Conn.

AVAILABLE FROM

STOCK AT THE P&W BRANCH OFFICE NEAR YOU



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 490 on Reader Service Card

new shop equipment . . .

DRILLING AND TAPPING MACHINE WITH PRESET SELECTIVE CYCLE CONTROL

National Automatic Tool Co., Inc., Richmond, Ind., has announced a standard arrangement of its H-6 Multiple Spindle Drilling and Tapping Machine. This machine is now avail-

able with preset selective cycle control and a straight line indexing slide.

According to the manufacturer, this combination makes automated drilling and tapping practical even for small lot production of a variety of parts usually handled by gang drills. Operators are freed for other duties and set-up times are decreased.

In operation, the operator unloads the finished part, loads a new one and depresses starting switch. The machine

then goes through all operations and returns to loading position.

Over 100 combinations of operations are said to be possible simply by setting selector dials. Machining functions available include drill, tap, step drill, chamfer, countersink, counterbore, spotface and skip.

Table movement in the drilling cycle consists of rapid traverse up, feed up and rapid traverse down. Tapping cycles—rapid traverse up, feed up, feed down and rapid traverse down. Chamfer cycle (including countersinking, spotfacing and so on)—rapid traverse up, feed up, dwell and rapid traverse down. The table can also be arranged to travel a

NOW! 7 to 10 DAY DELIVERY
on Special Shape Carbide
Inserts of Proven Quality!



BLANKING DIE SECTIONS



ROTOR-DIE SECTIONS



PERFORATING PUNCHES & BUSHINGS



COLD HEADING HAMMERS



CUTOFF KNIFE INSERTS



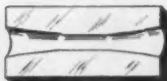
DRAWING DIE



COLD HEADING DIE INSERTS



GAGING



SWEDGING DIE INSERTS



BROACHING BLADES



NAIL TOOLING



COMPACTING

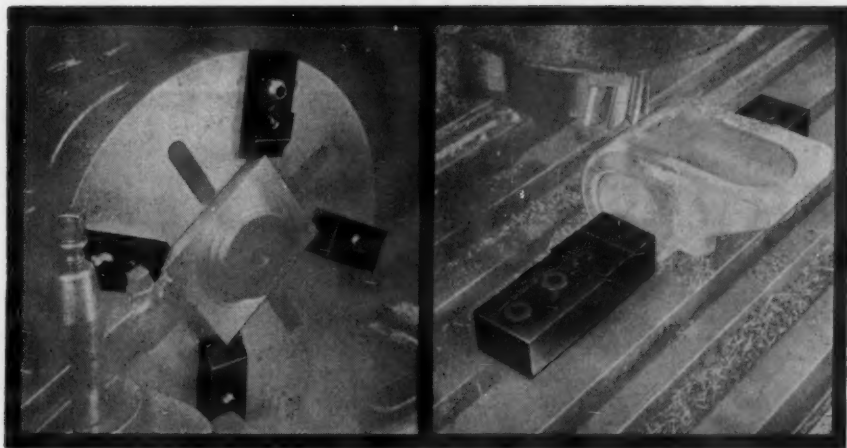


SPECIAL TOOL INSERTS

CARBIDE, INC.
29 HILLVIEW AVE.
LATROBE, PA.
Phone: KEystone 7-6781 - 7-4811

It's a fact
send us an
order and
we will de-
liver!

For more data circle 491 on Reader Service Card



J & S "ALL-PURPOSE" JAW CLAMPS CAN BE USED ON ALL STANDARD TYPES OF MILLING MACHINES, LATHES, PLANERS, BORING MILLERS, DRILL PRESSES, AND OTHER MACHINE TOOLS

Eliminate "U" Clamps, Straps and Fingers, cut handling time 75%

J & S "All-Purpose" Jaw Clamps give you many unusual advantages in securing workpieces to machine tools—save as much as 75% of the time required with outdated methods.

Downholding Principle

J & S' downholding principle makes this possible. Here's how it works: When you turn the adjusting screw of the clamp, the jaw travels straight *in* and *down*. This forces the workpiece horizontally against the opposite clamp and downward against the face plate or table. In this way, centering is quick, simple. The tapered slot prevents the clamp from slipping regardless of the load.

Need no U-clamps or straps

With J & S "All-Purpose" Jaw Clamps, you can avoid the use of U-clamps and straps, disregard different length studs and blocking. You can also minimize obstructions in set-ups, reduce cut-off waste. You can pass over J & S Jaw Clamps 1" from the working surface of the machine face. The whole surface of the workpiece can be machined to within $\frac{1}{8}$ " of the face plate or table.

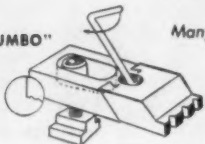
You can get J & S "All-Purpose" Jaw Clamps in a variety of sizes. Write for complete information today.

J & S "JUMBO" and "LI'L GIANT" JAW CLAMPS

For large planers

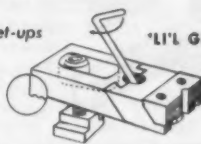
Many times more powerful than finger set-ups

"JUMBO"



COMPLETELY HARDENED

"LI'L GIANT"



Both clamps have T-nuts which fit all large standard planers. 45° oblique travel of jaw secures workpiece against table and against counterthrust of opposite clamp. $\frac{1}{8}$ " back taper (dotted line) and relieved ground surface (magnified detail) prevent slippage



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

871 DORSA AVENUE, LIVINGSTON, NEW JERSEY

For more data circle 492 on Reader Service Card

August, 1957

modern machine shop 237



TRUE POINT

BRUSH TOP CANS

new shop equipment . . .

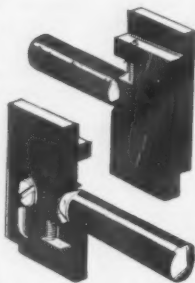
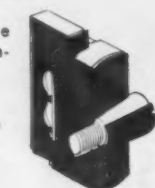
A BETTER BORING BAR

because our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life, especially with tungsten carbide.

Square hole sizes range from $\frac{1}{8}$ " up to and including $\frac{3}{4}$ ".

TYPE "B" & "C" CUTTERS

A strong rigid serrated 2-bladed cutter-located in the bar with a taper pin. Bore holes accurately to close limits. Can be expanded and reground giving long life. Sizes $\frac{7}{8}$ " dia. up to 6".



A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded. Fits other bars with slots

$\frac{3}{8}$ " x $\frac{7}{8}$ "	$\frac{3}{8}$ " x $1\frac{1}{8}$ "
$\frac{1}{2}$ " x 1"	$\frac{3}{8}$ " x $1\frac{1}{2}$ "

THE DETROIT BORING BAR CO.

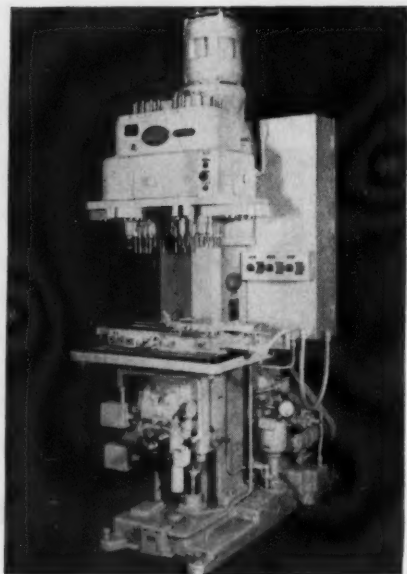
688 E. FORT ST.

DETROIT 26, MICH.

Established



1927



Natco H-6 machine is shown here equipped with adjustable spindles, three position indexing slide and selector switches

further distance for drilling than for chamfering operations.

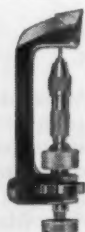
Table feeds are controlled by means of two dials, one for drilling and another for tapping. Taps of different leads can be used by virtue of the vertical float arrangement built into the spindles. The hydraulically actuated indexing slide is electrically controlled by means of the selector switches and is available with 2, 3, 4 or 5 positions. Various workholding fixtures can be mounted on the slide.

The basic machine consists of a multiple spindle geared head and a hydraulic feed table. Spindles are driven through universal joints; they can be arranged with adjustable arms for positioning or can be fixed in the re-

For more data circle 493 on Reader Service Card

238 modern machine shop

August, 1957



TRUE POINT DRILL SHARPENER

for Drills 41-60 and
61-80 R.H. & L.H.

A properly sharpened drill cuts
faster — more accurately and is
less likely to break.

Write for circular and
full details.

UP-TO-DATE TOOL CO.

P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 494 on Reader Service Card

BRUSH TOP CANS For Layout Blue!



HANDY, ELLISCO BRUSH TOP
CANS MAKE IT EASIER FOR
YOU TO APPLY AND STORE
LAYOUT BLUE. BRUSH KEEPS
MOIST IN CAN. CONTENTS
WON'T DRY OUT 3 OZ. TO 1
QT. CAPACITIES. GET DETAILS
AND BULLETIN NO. 60A.

George D. Ellis & Sons, Inc.

4024 N. American St., Philadelphia 40, Pa.

For more data circle 495 on Reader Service Card

The "MASTER COMPAR"

INDICATING MICROMETER COMPARATOR

has the **VISIBLE** feel

No Arguments as to
correctness of reading
due to "feel"

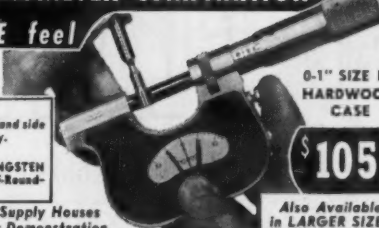
Use it as Comparator,
Master Micrometer,
Go & No Go Gage.

1" Range reading in
1/10,000"

To attain permanent accuracy
at these close limits, highest
precision workmanship and
exclusive design of mechanism
are of Major Importance
and ONLY found in
"MASTER COMPAR"

A RIGHT HAND TOOL
Release button for movable Anvils on RIGHT Hand side
enables you to hold feel the conventional way.

NEW — Resetting to Zero in 5 seconds
Quick adjustable tolerance hands. Heavy TUNGSTEN
CARBIDE Anvils will actually measure Out-of-Round-
ness, Ovalness and Taper.



0-1" SIZE IN
HARDWOOD
CASE

\$105

Also Available
in LARGER SIZES

Ask for Illustrated Circular — Code G10FF Sold thru Tool Supply Houses
Ask for Demonstration

GEORGE SCHERR CO., INC. 200-MM LAFAYETTE STREET • NEW YORK 12, N.Y.

For more data circle 496 on Reader Service Card



cut weld cleaning time by 85%

Throw away your cold chisel and whisk
off weld spatter with a dry rag! Protect-
O-Metal spatter-proofing compounds make
weld cleaning a breeze. Improve your welds
at the same time . . . P-O-M compounds quiet
the arc, improve fusion and electrode operation,
prevent oxidation and annealing scale,
cause no porosity. No smoke odors, or
fumes.

P-O-M No. 2. Non-inflammable, non-toxic
water-soluble paste. Inorganic. Thin before
applying and start welding at once. \$3.40 per
gallon, f.o.b. Dayton.

P-O-M No. 8. Rust- and corrosion-resistant
resin base compound. Comes ready to use.
Safe for all metals. Good paint primer; per-
mits outdoor storage of subassemblies. \$3.45
per gallon, f.o.b. Dayton.

MONEY-BACK TRIAL OFFER

Order a trial gallon of each
today for testing in your shop.
We'll cancel the bill if you're
not satisfied.

PROTECT-O-METAL

G. W. SMITH & SONS, INC.

1700 SPAULDING RD., DAYTON 3, OHIO

For more data circle 497 on Reader Service Card

August, 1957

modern machine shop 239

new shop equipment . . .

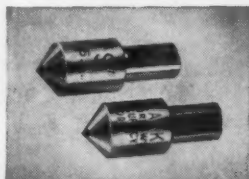
quired layout by a slip spindle plate fastened to the head of the machine. Up to 24 spindles can be used on the H-6, depending primarily upon horsepower consumed. Spindle drive motor is 3 h.p. on the standard H-6 and 5 h.p. on the heavy-duty machine.

For more data circle 109 on Reader Service Card

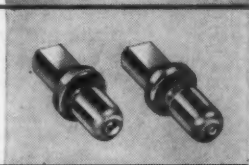
Call on CLARK

for All Your "Rockwell Testing" Needs

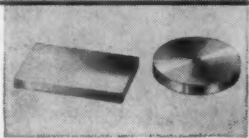
CLARK Diamond Cone Penetrators are exactly right for your "Rockwell" hardness tester, whether or not it bears the CLARK name. Every step in their manufacture, from careful diamond selection to expert lapping, leads to a precision product that will give you precision results. Yet CLARK Diamond Penetrators cost surprisingly little.



CLARK Steel Ball Penetrators, for accurate "Rockwell testing" of unhardened steel, cast iron, brass, bronze, and similar materials, are available in all standard sizes.



CLARK Test Blocks, in various hardness grades, provide a quick, sure, and simple method of checking the accuracy of your "Rockwell" type hardness tester.



Write today for descriptions and prices.

CLARK INSTRUMENT, INC.
10204 Ford Road • Dearborn, Mich., U.S.A.

CLARK
CLARK

For more data circle 498 on Reader Service Card

240 modern machine shop

GAS CONVERTOR IS COMPLETELY AUTOMATIC

Hevi-Duty Electric Co., Milwaukee 1, Wis., has announced a completely automatic gas convertor. This compact unit produces a prepared atmosphere through the exothermic reactions of controlled ratios of gas and air. Manufactured, natural or bottled gas may be used and no outside source of air is required. The prepared gas suitable

for hardening, annealing of copper and ferrous metals, sintering, tempering and other operations.

This unit is equipped with an automatic ignition that provides simple, quick starting. Gages, flow meters and sampling valve are all panel mounted at the proper height for easy inspection.



View of Hevi-Duty Gas Convertor

August, 1957

THE HELIOS

50 EK VERNIER

CALIPER

With Automatic Thumb Lock . . . With all Inch Scales or one Inch and one Metric Scale:

\$9.90

The 55 A with set screw lock with one Inch and one Metric scale or all Inch scales:

\$8.90

All prices F.O.B. New York

Also available . . .

Dull Chrome finish calipers and Dial Indicator calipers

For details on other imported precision instruments, write

**NEISE
MODERNTOOLS**

KARL A. NEISE, Dept. MMS
404 Fourth Avenue
New York 16, N. Y.

6" SCALE
HARDENED
Guaranteed
Accuracy
within .001"
Double Length
Vernier



BAND SAW ACCESSORIES

. . . mean the important difference of quality. You'll find Carter wheels and guides on virtually all band saws known for top performance and dependable, long life.



- Rigid Band Saw Wheels
- Demountable Tires
- Micro-Guides
- Guide-Line Lights



CARTER PRODUCTS CO. INC.

426 Wm. Alden Smith Bldg., 30 Ionia Avenue, S. W.
GRAND RAPIDS 2 MICHIGAN

For more data circle 499 on Reader Service Card

For more data circle 500 on Reader Service Card



BASIC PRICE
\$ 395⁰⁰



The New SCHERR MICRO-PROJECTOR

with the VERTICAL design



- ✓ RIGID FLOOR BASE - ELIMINATING EXTRA CHARGE FOR TABLE
- ✓ TILTING STAGE FOR HELIX, ANGLES AND BEVELS

- ✓ 4" DIA. STAGE OPENING
- ✓ COLUMN SLIDE ADJUSTABLE FOR WEAR BY MEANS OF GIBS - WILL HOLD SQUARE INDEFINITELY.
- ✓ CUSTOM MADE PRECISION COATED LENSES & DOUBLE CONDENSERS FOR DIFFERENT OBJECTIVES 10 TO 100 X MAGNIFICATION.
- ✓ AN ENTIRELY NEW PRACTICAL DESIGNED TOOL FOR INSPECTION DEPARTMENT AND PRODUCTION SHOP.

WRITE FOR ILLUSTRATED FOLDER

GEORGE SCHERR CO., Inc.

COMPLETE LINE OF PRECISION INSTRUMENTS

200-MMLAFAYETTE STREET • NEW YORK 12, N.Y.

For more data circle 501 on Reader Service Card

August, 1957

modern machine shop 241

READ TEMPERATURES

CAM MILLING

new shop equipment . . .

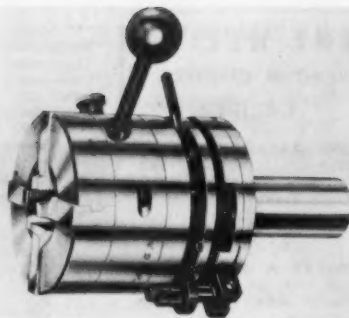
tion and adjustment. The capacity of this convertor is 200 cubic feet of prepared atmosphere per hour.

For more data circle 110 on Reader Service Card

★ ★ ★

DIE HEAD WITH ALIGNING SHANK

Geometric Tool Company Division, Greenfield Tap and Die Corp., New Haven 15, Conn., has announced an improvement in its line of "DD" Die Heads for hand machines. These die heads are now available with aligning shanks, having the same feature as the company's "DS" and "DSA" Die Heads. This feature is said to provide for properly aligning the die head with



Geometric "DD" Die Head for hand machines

the work to be threaded, which is essential for the cutting of accurate screw heads.

Shanks can be supplied in the flanged style, as well as the straight shanks shown in the illustration.

For more data circle 111 on Reader Service Card

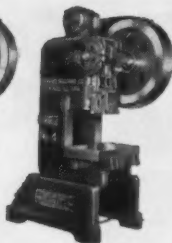
You Can Rely on a ROUSSELLE



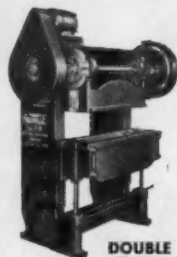
DEEP
THROAT
PRESS



HORN
PRESS



O.B.I. PRESS



DOUBLE
CRANK
PRESS

THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rousselle Presses

SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.


For more data circle 502 on Reader Service Card

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

READ TEMPERATURES FAST



ACCURATELY with PYRO OPTICAL PYROMETERS

Send for catalog No. B5
PYROMETER INSTRUMENT CO., INC.
 Bergenfield 42, New Jersey

For more data circle 503 on Reader Service Card

CAM MILLING JIG BORING



A SPECIALIZED CAM MILLING SERVICE, JIG BORING
 ... SPOT WELDING
 ... CONTRACT PRODUCTION
 EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO. 52-CM

EISLER ENGINEERING CO., INC.
 734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 504 on Reader Service Card

DYKEM STEEL BLUE



Stops Losses
 making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
 2301F North 11th St. • St. Louis 6, Mo.

With DYKEM Steel Blue Without DYKEM Steel Blue

For more data circle 505 on Reader Service Card

BUZZER
 REG. U.S. PAT. OFF.

INDUSTRIAL GAS EQUIPMENT
 BURNERS & FURNACES (Heat Treating, Melting, Soldering)

NO BLOWER OR OTHER POWER NEEDED
... just connect to gas supply!

Outstanding service since 1911! Each unit, with the famous "BUZZER" Venturi, delivers the hottest, quickest heat attainable without a blower. Full range control of heat and turn-down. Standards or specials available for manufactured, natural or liquefied gas applications.



Write for New "BUZZER" Catalog.



High Speed Full Muffle Furnaces



Large Floor Type Oven Furnaces

CHARLES A. HONES, INC.
 141 S. Grand Avenue, Baldwin, L. I., New York • Baldwin 3-1110

For more data circle 506 on Reader Service Card

new shop equipment . . .

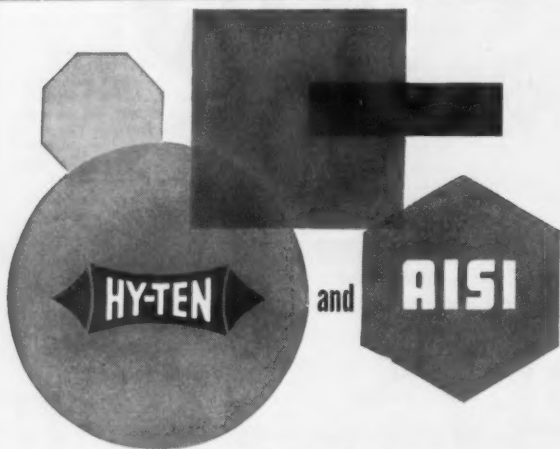
IMPROVED DESIGN FOR CUPS AND PACKINGS

A line of cups and packings, that offers greater service life through improved design, has been announced by Chicago Rawhide Manufacturing Co., 1233 Elston Ave., Chicago 22, Ill. Made of C/R Sirvis or Sirvis-Conpor

(elastomer impregnated) mechanical leather, the cups are preformed on special dies to produce a sharp, rather than round, heel. According to the manufacturer, advantages of the new molded design are greater density at the heel of the cup, and the fact that the cups are preformed to the shape which conventional, round heel cups are forced to assume under pressure of application. This eliminates operational stress and flexing and contributes to service life.

Tests conducted with a C/R cup of conventional design and a C/R cup of the sharp heel molded design were run in a hydraulic cylinder for 3,000 cycles at 6,000 p.s.i. The manufacturer states that results showed marked wear and distortion at the heel of the conventional cup and little, if any, appreciable wear on the new molded design.

For more data circle 112 on Reader Service Card



**... alloy steel bars, billets and forgings
in sizes, shapes and treatments for every need!**

All seven of our warehouses are staffed and supplied to fill your alloy steel requirements promptly whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow".

Write today for Wheelock, Lovejoy Data Sheets containing complete information on grades, applications, physical properties, tests, heat treating, etc.

NEAR YOU . . . Warehouse Service — Cambridge • Cleveland
Chicago • Hillside, N. J. • Detroit • Buffalo • Cincinnati
In Canada — Sanderson-Newbould, Ltd., Montreal and Toronto

WHELOCK, LOVEJOY & COMPANY, INC.

139 Sidney Street, Cambridge 39, Mass.

For more data circle 507 on Reader Service Card



C/R Leather Cup

CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—
Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 508 on Reader Service Card

BARCO BULLETIN Q200 on GOLD WATERLESS DEGREASING

Request Newest Data on
SAFE Care of all Machinery,
Motors, Tools, Dies, Fixtures,
Etc. • Approved by Under-
writers' Labs. Inc.



BARCO Chemical Products Co.
701 S. LaSalle St. Chicago 5, Illinois

For more data circle 509 on Reader Service Card

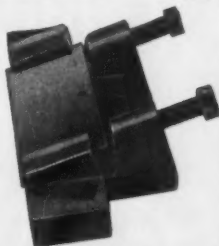
QUICK SURE GRIP...

FOR ANY WORK ON ANY MACHINE TABLE

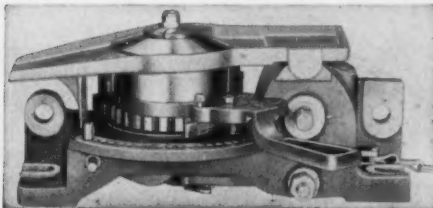
HART DIVIDED MACHINE VISE JAWS

Write for
circular

WALTER W. FIELD & SON, INC.
39-51 HAYWARD STREET, CAMBRIDGE 42, MASS.



For more data circle 510 on Reader Service Card



DEARBORN Automatic Chucking and Indexing Fixture

FEATURES:

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2".

J. W. DEARBORN
ANSONIA • CONN.

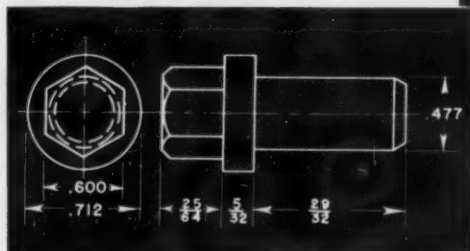
Write for illustrated data. Send blue-
prints or specifications of work.



For more data circle 511 on Reader Service Card

1200 PIECES PER HOUR

This piece was made from brass rod
and slotted as shown in the print be-
low. Production on this item was 1,200
pieces per hour.



new shop equipment . . .

QUICK CHANGE PRESET TOOLS FOR AUTOMATICS

The development of a line of quick change tools, designed for holding end cutting tools on automatic screw machines, has been announced by Scully-Jones and Co., 1909 South Rockwell St., Chicago 8, Ill. The tooling pro-

vides these advantages for operations on multiple spindle automatics: reduced downtime with quick change tools; preset tooling that guarantees accurate reproduction of parts and eliminates in-the-machine adjustments; and operation of the machine at the optimum cutting speed that gives lowest machining cost per piece produced.

These quick change tools have been engineered as both front removal and

rear removal types to accommodate the broadest possible range of tools and installation requirements. They permit a considerable latitude in tool size that can be used on any particular type of bar or chucking machine.

Because the quick change tools permit a worn tool to be replaced in seconds, there is no need to stretch out

over **14,000** Different Selections
For Immediate Delivery!



Quality-Famous, Heavy Duty
AIR AND HYDRAULIC

CYLINDERS

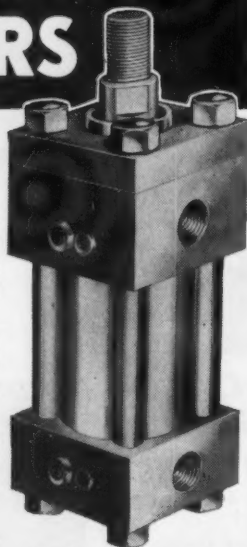
now "in stock" for
immediate shipment to you
in popular sizes, mountings

Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



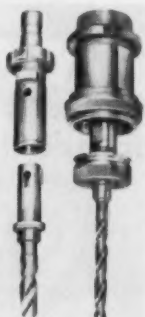
Write for Complete
Data and Prices

**MILLER FLUID POWER DIVISION**

FLICK-REEDY CORP.

2024 N. HAWTHORNE • MELROSE PARK, ILL

CYLINDERS • BOOSTERS • ACCUMULATORS
Sales and Service—From Coast To Coast



(Left) Scully-Jones
Back Removal Chuck,
and (Right) Quick
Change Chuck

For more data circle 512 on Reader Service Card

tool life by operating machines below peak efficiency due to one troublesome or short tool life station. Tool changes are also freed from end of shift changeover patterns. Resharpened tools are preset in an adapter while the machine continues to produce. Then, when a tool change is required, the quick change tool in the machine is removed and the preset sharp tool is inserted in seconds. No in-the-machine adjustment of tool is required.

When combined with the Toolitrol Counters, these tools are said to yield even greater operating economies. Because the Toolitrol Counters keep track of production and signal when a change is required, the possibility of producing either under-size or oversize parts, due to tools beginning to get dull, is virtually eliminated.

For more data circle 113 on Reader Service Card

★ ★ ★

HIGH SPEED HOLE DRILLS

Chicago - Latrobe, 419 West Ontario St., Chicago 10, Ill., has announced a line of High Speed Micro Drills. These precision made drills are



Chicago-Latrobe High Speed Micro Drill

used in the watchmaking, fuel injector, instrument and similar fields, where extreme accuracy in drilling small holes is required.

The drills are manufactured of high speed steel, ground to exacting toler-



PAT. PENDING

Satisfaction Guaranteed Or Money Back TRIAL OFFER

TRU-SEAL Fittings are guaranteed to seal pipe thread connections permanently against all oils, practically all known chemicals and gases; to seal under high pressures or vacuum; to withstand -280° to plus 500° F.; to eliminate "overtightening" damage and pipe dope. Available in $\frac{1}{8}$ " to $2\frac{1}{2}$ " pipe thread sizes.

\$10.00 Trial Offer No. 1: eight $\frac{1}{8}$ ", ten $\frac{1}{4}$ ", eight $\frac{3}{8}$ ", ten $\frac{1}{2}$ " pipe thread **TRU-SEAL** Fittings.

\$10.00 Trial Offer No. 2: eight $\frac{1}{2}$ ", ten $\frac{3}{4}$ ", four 1" pipe thread **TRU-SEAL** Fittings. Send order to

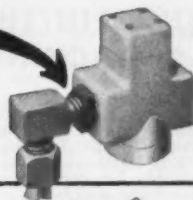
TRU-SEAL

DIVISION
Flick Reedy Corporation

2024 N. Hawthorne, Melrose Park, Ill.

"Miller Fluid Power" is also a Div. of Flick-Reedy Corp.

STOPS PIPE THREAD LEAKS



Thread **TRU-SEAL** on pipe or fitting (no messy pipe "dope" needed).

1 SEAL SIDE

Thread pipe or fitting 4 threads into part. Point in desired direction.

2

Tighten **TRU-SEAL** to complete leakproof assembly (only light torque required).

3

For more data circle 513 on Reader Service Card

August, 1957

modern machine shop 247

new shop equipment . . .

ances and are available in sizes ranging from 0.0059 to 0.0394. Moreover, they are available from stock in two types; namely, straight shank spiral flute with right or left hand spiral and flat flute with straight shank and right or left hand cut.

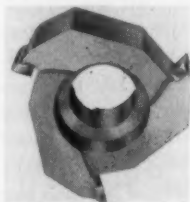
For more data circle 114 on Reader Service Card

SERIES OF CARBIDE TIPPED THREE FLUTE SHELL END MILLS

A group of Series 400 Three Flute Carbide Tipped Shell End Mills has recently been announced by Nelco Tool Co., Inc., Manchester, Conn. These shell end mills, for use with standard type "C" arbors, have been designed for face milling operations and fine finish on aluminum, magnesium, brass or bronze alloys and plas-

tic materials. The carbide tips are of substantial proportion and are sandwich brazed to the rugged alloy body, making a strong, one piece cutting tool that will safely withstand ultra high speed operation. The three tooth design allows ample room for chip flow and the off tooth construction results in a good finish on soft materials. Carbide tips protrude above the cutter body to eliminate snagging the steel body with diamond wheel when regrounding.

For more data circle 115 on Reader Service Card



Nelco Shell End Mill

Deburrers 1520

1" TUBE ENDS PER HR. on PINES END FINISHING MACHINE

Here's another outstanding example of how the Pines No. 600 End-Finishing Machine is setting records for production speed and efficiency. Today, at Configured Tube Products Company, Bellwood, Illinois, the Pines Machine (shown at right) performs inside and outside deburring on 1"

steel tubing at net production rates of 1520 tube ends per hour. Such high-speed production is made possible by the exclusive design of the Pines Machine which enables the operator to clamp and feed work to the rotating cutters in one pass, so that one hand is always free for rapid stock handling.

Exclusive Features Speed Work

Still other outstanding Pines features such as quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings assure fast, accurate work. The Pines No. 600 handles chamfering, pointing, facing, and reaming operations, as well as deburring, on stock diameters up to 2". Maximum feed stroke is 1-1/4". Automatic air-operated units for higher production work, and larger sizes up to 5" capacity are also available.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 644 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

FREE BULLETIN

Write for facts on how these machines cut production costs.



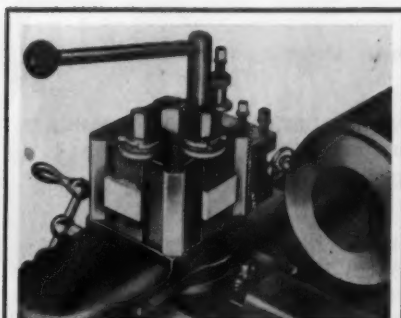
For more data circle 514 on Reader Service Card

READ ABOUT IT— Comet.
BORING TOOLS
(H.S.S. and Carbide)
for Holes from 1/16" upward
STANDARD AND SPECIAL BORING, FACING & INTERNAL THREADING TOOLS. Write for Data
Bore Small Holes? Contact COMET
COMET Tool Co.
738-52 Broadway, New York 3, N. Y.

For more data circle 515 on Reader Service Card

CAMS
Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.
Your Inquiries Answered Promptly
HIMOFF MACHINE CO., INC.
23-16 44th Road Long Island City 1, N. Y.

For more data circle 516 on Reader Service Card



**MASTER MULTI TOOLHOLDER
"BONI"**

- Clamp with guaranteed accuracy of .0001"
- Adjust Cutters to proper height easily and quickly
- Make unlimited tool changes and operations with different tools
- Save considerable set-up time—up to 90%—in individual as well as production work

MODERNIZE YOUR LATHES!
PRODUCE MORE WITH GREATER PRECISION!
Five sizes available for center heights from 4" to 18"
Sole U.S.A. Representatives:

**NEISE
MODERN TOOLS**

KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

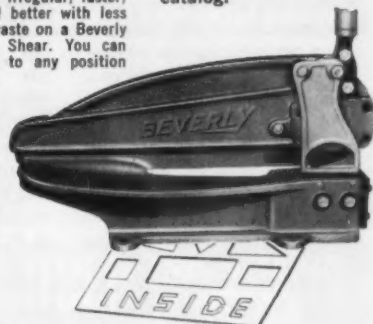
For more data circle 517 on Reader Service Card

Beverly THROATLESS SHEAR
Cut any Shape... **STRAIGHT OR IRREGULAR**

Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models — capacities 18 gauge to 3/16" mild. All shears equipped with H.C. H.C. Blades for cutting Stainless.

B-3 with Ball Bearing Hold Down

INSIDE SLOTTER
8" Reach — 16 ga. cap.
Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2 1/2 x 1/8" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.
See your Beverly Dealer or write for illustrated catalog.



BEVERLY SHEAR MFG. CO., 3000 W. 111th St., Chicago 43, Ill.

For more data circle 518 on Reader Service Card

August, 1957

modern machine shop 249

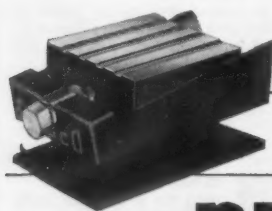
new shop equipment . . .

NEW PLACEMENT OF TEMPLATE PINS ON BAND SAW GUIDES INCREASE ACCURACY

Carter Products Co., Inc., 426 Wm. Alden Smith Bldg., 30 Iona Ave., South West, Grand Rapids 2, Mich., recently announced that new placement of template pins on its Band-

saw Micro-Guides is said to now make possible greater accuracy and speed on any type of repetitive bandsawing operation.

The template pins have been moved forward, closer to the cutting point of the tooth, making it easier to follow the template accurately. The pins step up production with increased accuracy and are also claimed to speed work by completely eliminating the need for marking stock prior to sawing.



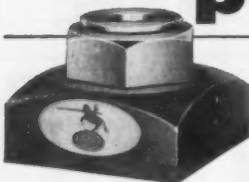
How to

keep

precision

in a precision

machine



SET YOUR MACHINES LEVEL AND KEEP THEM LEVEL WITH EMPCO LEVELING JACKS

You're paying for precision. *But . . . are you getting it?* Improper leveling and excessive vibration can seriously impair the precision performance you pay for in costly machine tools. *Set* your machines level and *keep* them level with EMPCO Leveling Jacks! EMPCO Jacks provide a solid, smoothly adjustable foundation for machine tools, large surface plates, automation lines, tool room and production

equipment of all types. Easily installed, they increase machine efficiency, reduce downtime and maintenance. Periodic releveling is a quick, easy one-man job. Combined with VI-SORB Mounting Pads, EMPCO Jacks control internal and transmitted vibrations, reduce noise and retard machine creepage. Jacks available in six styles, 25 models. Pads cut to fit.

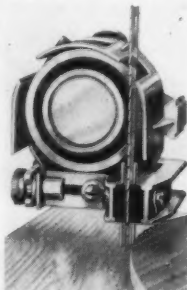
Send Today for Descriptive Bulletin No. 100—
The Enterprise Machine Parts Corporation
2715 Jerome Avenue • Detroit 12, Michigan



For more data circle 519 on Reader Service Card

Blocks are made of hardened steel and pins of special stiff rod, which will not break. The template pin blocks are now available on all three sizes of Carter Micro-Guides, which are used in the metalworking and woodworking industries to permit accurate high-speed operation, reduce band saw breakage and increase safety and ease of saw blade adjustment.

For more data circle 116 on Reader Service Card



Carter Bandsaw Micro-Guide with template pin blocks

REDUCE TOOL GRINDING TIME

with **PRE-GROUND COMBINATION**
Right & Left Hand
TOOL BIT
COBALT STEEL

Grind tool end only... Lasts longer... Hollow ground

Trial bit, 3/8" sq. x 3", only \$1.75 postpaid

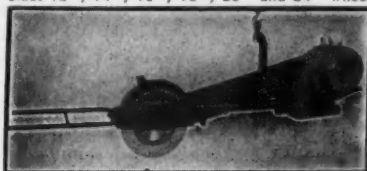
Available all sizes... prices on request... quantity discounts

TOOL-CRAFT CO., HACKETTSTOWN, N. J.

For more data circle 520 on Reader Service Card

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels



Ask for Descriptive Circular

MUMMERT-DIXON CO.

120 Philadelphia St.

Hanover, Pa.

For more data circle 521 on Reader Service Card

THE TWO IN ONE

**COMBINATION
ROTARY TABLE
AND
ANGLE PLATE
PRECISION
ACCURACY**

**WORM adjust-
able from
0 to 90
degrees.**

**VERNIER
control to
within**



WRITE FOR FOLDER 2 seconds of Arc.

Makers of Helical Gear Speed Reducers.
Worm and Gear Speed Reducers. Stand-
ard and Special Gears. Wedge-Lock
Turret for Lathes and Turret Lathes.

Open territory available to representatives

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST. + WAKEFIELD, MASS.

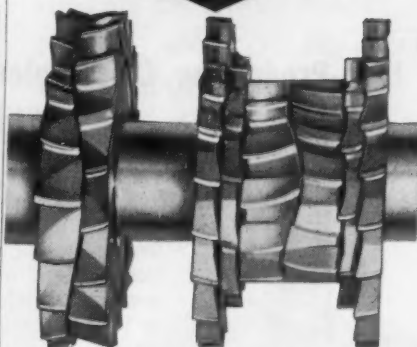
For more data circle 522 on Reader Service Card

August, 1957

ABER

Curved Tooth

MULTIPLE CUTTERS



By using the wide range of Standard ABER CUTTERS for gang milling... fast accurate cuts on any number of surfaces simultaneously.

ABER Engineering service will design and make the unit exactly suited to your job... send blueprints and specify material to be cut.

ABER Curved Tooth PLUS FEATURES

1. Longer production runs
2. More accurate control of limits and finish
3. Elimination of chatter

4. Faster heat dissipation
5. Shearing action

FREE DATA —

24 page catalog on milling with ABER Cutters.



ABER ENGINEERING WORKS

WATERFORD, WISCONSIN

For more data circle 523 on Reader Service Card

modern machine shop 251

new shop equipment . . .

FINGER TYPE DIAL INDICATOR

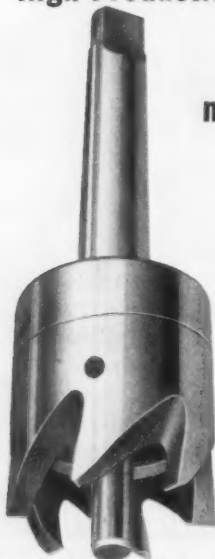
The Pearson Dial Indicator, a highly sensitive finger type indicator, is being marketed by M and G Instrument Co., 12940 Saticoy St., North Hollywood, Calif. This dial indicator fills a long felt toolroom need for a rugged, easy to read, sensitive, non-sticking

dial indicator. The Pearson has a clear vision dial graduated to 0.050 (the range of the indicator is 0.075). Included among its features are: it will read either direction with no reversing lever or old fashioned gear shifting; it is unusually accurate and will repeat within 0.0001 making it useful for height gage or other gaging work requiring repetitive indications; it is highly sensitive and will track

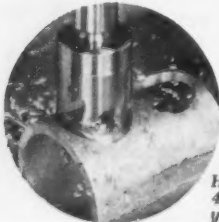
with no appreciable lag making it ideal for aligning holes on a jig borer, boring mill, truing, straightening and general setting up to within 0.0001 inch; it has an extra long contact point, making it accessible and versatile; the Pearson has a non-sticking movement offering years of trouble free service and it has an unconditional lifetime guarantee.

High-Production, Close-Tolerance HOLES in ONE PASS!

new *Clark* HOLE-MILL



One arbor accommodates several HOLE-MILL sizes.



Designed for high-speed production of close-tolerance, fixed-diameter holes, the smallest Clark HOLE-MILL cuts stock up to 1" thick. Completes holes from one side in a single pass—without clearing chips! Piloted action makes accurate starts on cylindrical, flat or crowned surfaces. Pilot can be replaced with stub drill.

Uses new M3-type high-speed steel... takes heavy cuts on all materials including alloy steels and permits use of automatic feeds on machines. Can also be used on heavy-duty portable drills. HOLE-MILL sizes from 1" to 4" by fractions, decimal sizes on order. Shanks furnished straight or with Morse tapers, other tapers available. Write for circular and prices! Ask for Clark HOLE-MILL—made by specialists in Hole-Making Tools!

Robert H. Clark Company

9330 Santa Monica Blvd.
Beverly Hills, California

HOLE-MILLS smaller than 1" or larger than 4" supplied on special order. Write detailing your needs.

For more data circle 524 on Reader Service Card



Pearson Finger Type Dial Indicator



**LINCOLN IDEALARC WELDERS
OFFER EITHER DC OR AC
WELDING CURRENT
AT THE FLICK OF A SWITCH.
CAPACITIES FROM
180 AMPS. TO 500 AMPS.
OPERATE ON SINGLE PHASE
POWER...AND COST NO MORE
THAN ORDINARY DC WELDERS**

300, 400 and 500 Amps.
models (left)

180, 250 Amps. models (below)



**BULLETIN
SB-1350**

contains construction details
and specifications. Bulletin
SB-1343 tells what it will
do for you. Write
for them.

THE LINCOLN ELECTRIC COMPANY

Dept. 3515 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

For more data circle 525 on Reader Service Card

new shop equipment . . .

Other features include a 360 degree universal swivel joint, which supplies positive support in any position convenient to the work. In addition, the indicator is ratchet set to provide for full adjustability.

For more data circle 117 on Reader Service Card

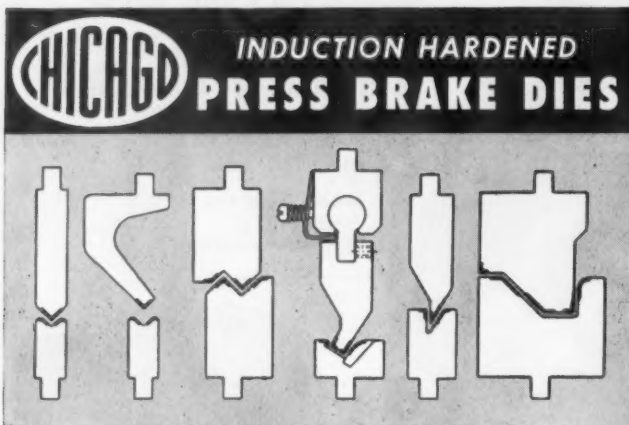
PIN TYPE CHAIN

Forged steel conveyor chain, each link made with a wing attachment, has recently been brought on the market by Robert A. Main and Sons, Inc., 28 Pascack Rd., Paramus, N. J. This pin type chain, made of forged quality steel and heat treated, is manufactured for maximum strength conditions and is claimed to stand extra hard wear and shock. It can be furnished for acid or

heat conditions using either corrosion or heat resistant materials.

It is easy to take apart or assemble due to its simple design. Each pin is locked against rotation. Each link has a wing attachment, making it easy to attach wood or metal conveyor slats for all types of duty. It can be used in single or multiple strands. Due to its uniform size, links need not be matched. It is available in standard pitches. Sprockets and conveyor aprons can be supplied.

For more data circle 118 on Reader Service Card



Heavy lines indicate hardened surfaces

**for greater die life —
at no extra cost —
on any make press brake**

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO induction-hardened dies for your next press brake job.

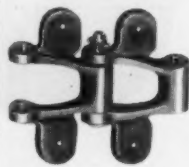
Steel Bending Brakes For Over Fifty Years

4901

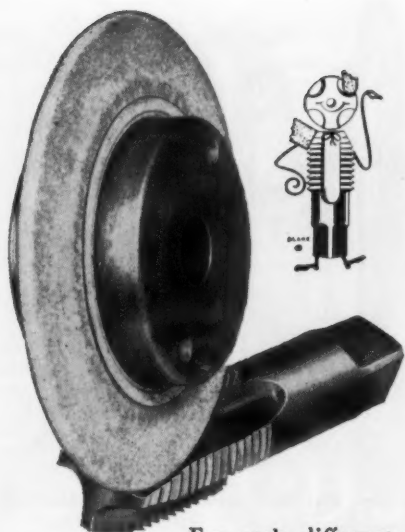


7418 S. Loomis Blvd., Chicago 36, Ill

For more data circle 526 on Reader Service Card



Main Pin Type Chain



For Profitable Tapping, Grind Your OWN Best Rake Angles!

*Controlled grinding
of tap flutes and chamfers.*

For each different material, there is a "best" rake or hook angle for tapping. You can grind and re-grind this angle on taps for each of your jobs . . . positively and accurately, time after time . . . with the BLAKE Flute Grinder.*

Combined with the BLAKE Chamfer Grinder, this machine can give you substantial savings even with Class 3 or 4 fit standards, because you will have:

1. Best rake or hook angle for the material tapped.
2. Exact indexing of cutting edges.
3. Correct spiral points.
4. Accurately relieved chamfers.

The increased uniformity and accuracy of your threads, plus far greater tap life, are the sound basis for maximum savings in your tapping costs.

Ask us for the details of what this combination can do for you.

**Now available with air operated vertical slide.*

EDWARD

BLAKE

COMPANY
INC.

MANUFACTURERS OF FLUTE AND CHAMFER GRINDERS

438 CHERRY ST., WEST NEWTON 65, MASS.

Exclusive Distributors of:

BLACK DIAMOND PRECISION DRILL GRINDERS • SURFACE FINISH STANDARDS • WORCESTER DRILL GRINDERS

For more data circle 527 on Reader Service Card

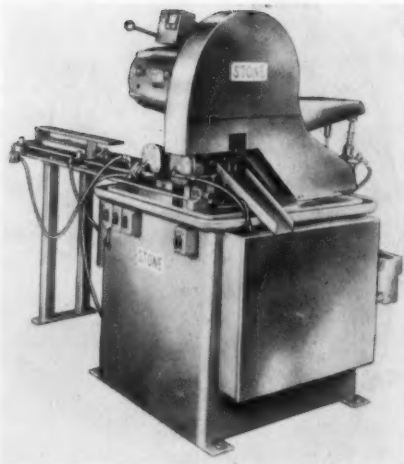
August, 1957

modern machine shop 255

new shop equipment . . .

CUT-OFF MACHINE IS COMPLETELY AUTOMATIC

Stone Machinery Co., Inc., 131 Fayette St., Manlius, N. Y., has announced a powerful cut-off machine, the fully automatic Model M-100. Powered by a 10 h.p., continuous duty, totally enclosed fan cooled ball bearing induction type motor, the Model M-100 cuts ferrous metals with an abrasive wheel and non-ferrous with a saw blade. The



Model M-100 Automatic Cut-Off Machine

geared in head motor delivers all the power to the cutting edge. Tolerances are held to plus or minus 0.010 inch on production runs.

The Model M-100 has an automatic stock feed to accommodate a wide range of shapes, lengths and diameters

TRUE-TRACE

MACHINE TOOL CONTROLS

Send for new 24 page catalogue

Greater production and increased profits thru 1, 2 and 3 slide control hydraulic tracers and numerical controls.

TRUE-TRACE SALES CORP.

EL MONTE 7, CALIF.

For more data circle 528 on Reader Service Card

GRIND: RADIUS—ANGLE

QUICKLY

RADIUS DRESSER \$44.00

Diamond \$8.00

EASILY

ANGLE DRESSER \$49.00

Diamond \$8.00

ORDER DIRECT
on our 10 day
money back
guarantee

Chatter Resistant, Spring Loaded Spindle
Hardened shaft—bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.
All surfaces ground true from hole.
CAPACITY—1½" convex to 4" concave.
10" Wheel size for DoALL and NORTON Grinders—\$49.00 Diamond \$8.00.

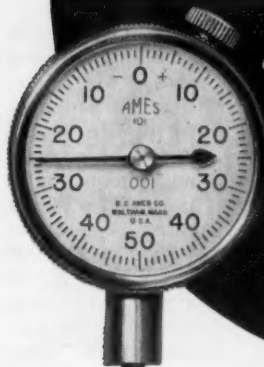
Ball Thrust Bearing.—
24 Precision Ground Surfaces.—**DIAMOND BLOCK** Slides In Ground & Lapped Housing, Can't Chatter.—Set Accurately With Protractor or Sine Bar.—Largest Bearing Surfaces.

The "Mighty Midget" Line

SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

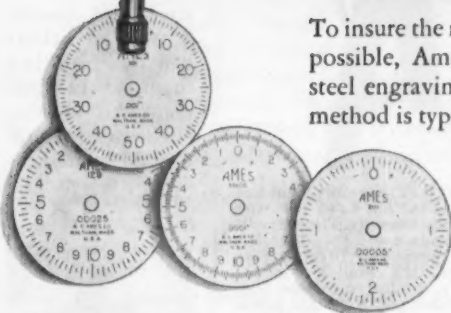
For more data circle 529 on Reader Service Card

AMES



*...the preferred
Dial Indicators*

dials are printed from
steel engravings only!



To insure the most accurate and legible graduations possible, Ames Dial Indicators are printed with steel engravings exclusively. The use of this costly method is typical of Ames' insistence on maximum precision in every detail. It explains why the lifetime cost of Ames Dial Indicators is lower, and why so many quality control engineers specify Ames as "*preferred*". Write today for complete information.

Representatives in principal cities



B. C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

For more data circle 530 on Reader Service Card

August, 1957

modern machine shop 257

new shop equipment . . .

and will handle any material from aluminum to hardened tool steel.

An abrasive wheel wear compensator automatically adjusts for fast, accurate cutting and adds to the wheel life.

The Model M-100 comes equipped for either manual or semi-automatic

operation, and where greater power is needed, a 15 horsepower motor is readily available.

For more data circle 119 on Reader Service Card

★ ★ ★

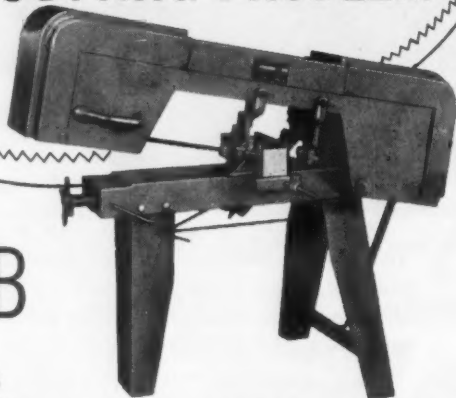
LOW VOLUME 1,000 P.S.I. HYDRAULIC PUMP

A compact wet sump hydraulic gear type pump is now available from De-

troit Testing Machine Co., 9390 Grinnell Ave., Detroit 13, Mich. User for years in the company's own product line, it is now available to builders and users of equipment requiring a pump with a rated capacity of 0.5 g.p.m. at 1,000 p.s.i. at 1,800 r.p.m. This pump, known as the Detroit 1,000, contains hardened steel and bronze gears, the latter ball bearing mounted at both ends. All wearing surfaces are hard chrome plated.

For more data circle 120 on Reader Service Card

HERE'S THE ANSWER TO YOUR TOUGHEST CUTTING PROBLEM



model B
Metal Cutting
Band Saw
(Wet or Dry)

FEATURES

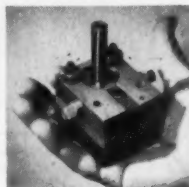
- Large Capacity
- Portability
- Light Weight
- 3-Point Suspension
- Operational Safety
- Centralized Controls
- Speed and Accuracy
- Lowest Cost

The Johnson Model B . . . the only light and semi-portable metal cutting band saw with wide-range heavy duty capacity. The versatile Model B is fast—accurate and economical, it easily handles 5' rounds and 10' flats with automatic precision. It's available in the standard Dry or Wet models to suit the need and can be caster equipped for plant portability. See for yourself, why Johnson Saws are preferred—everywhere! Write today for catalog and name of local dealer.

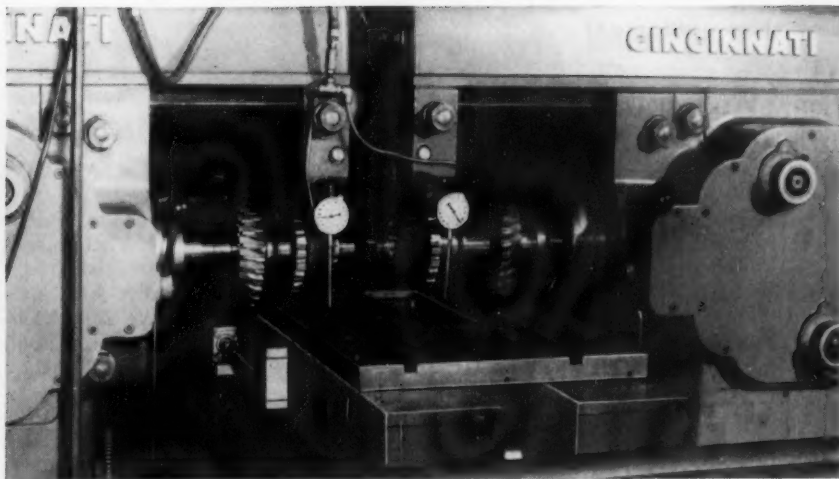
Johnson MANUFACTURING CORPORATION

1011 Barnes St., Albion, Michigan

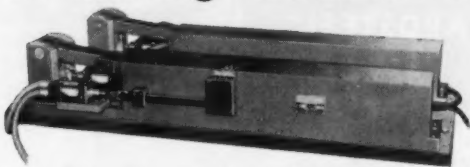
For more data circle 531 on Reader Service Card



View of Detroit
Hydraulic Pump



AUTOMATIC HOLDING AND UNLOADING of milling machine made possible by

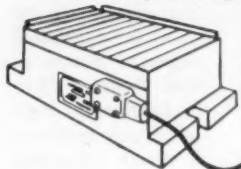


MAGNA-LOCK electro-magnetic CHUCKS

At Dalton Foundries, Warsaw, Indiana two parallel mounted Magna-Lock chucks hold cast iron saw tables while both sides and two miter slots are milled in one pass. Chucks are equipped with air-actuated disappearing end stops and work locator cycled with the milling machine, providing automatic holding and unloading of the work-pieces which are carried to the machine by a roller conveyor. The Magna-Lock chuck setup adjusts to four different saw table sizes and replaces time-consuming clamp-type fixtures.

This is just one more of scores of examples of how Magna-Lock electro-magnetic chucks and Magna-Lock engineering ingenuity are solving holding problems, cutting costs. It will pay *you*, too, to consult Magna-Lock.

Request Magna-Lock as original equipment on your new machines.



***Hanchett* MAGNA-LOCK
CORPORATION**

BIG RAPIDS, MICHIGAN, U. S. A.

designers and makers of a complete line of magnetic chucks and devices.

For more data circle 532 on Reader Service Card

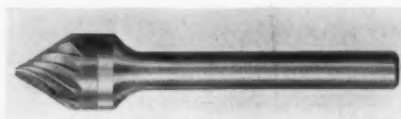
August, 1957

modern machine shop 259

new shop equipment . . .

SPIRAL FLUTE SOLID CARBIDE BUR

The Atrax Co., Newington 11, Conn., has announced the development of a countersink type solid carbide bur, incorporating right-hand spiral flutes. Tests were made using the bur (M-shape) to countersink 1/4 inch diameter holes in hardened die steel Rock-



View of Atrax Spiral Flute Solid Carbide Bur

well "C" 62-63. The bur was used at 300 r.p.m. Positive shearing action and unusual chip ride-out produced a mirror ground finish. Chamfer was sunk

to the full diameter of the tool, which showed no wear after countersinking 20 holes. According to the company, the M-141 RH Spiral Fluted Bur worked very well, regardless of whether countersinking was just a touch or to the full diameter of the tool.

For more data circle 121 on Reader Service Card

Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—
With "HARDSTEEL"**

BLACK DRILL COMPANY, INC.

1372 East 222nd St. • Cleveland 17, Ohio



"HARDSTEEL"

For more data circle 533 on Reader Service Card

260 modern machine shop

★ ★ ★

HYDRO-ELECTRIC LIFT TRUCK

Lift Trucks, Inc., Cincinnati 14, Ohio, has announced its improved Model KHL Straddle Type Lift Stacker that is said to be ideal for limited capacity elevators and floors. This hydroelectric high lift truck features a short turning radius that allows

August, 1957



YOU GET more* WHEN
YOU BUY BEARINGS FROM YOUR

Bunting®
DISTRIBUTOR

* **more**
dependability



Simplified standardized size listing
including all ASTM sizes—an exclusive
Bunting feature.

YOU CAN DEPEND ON BUNTING, the Bunting distributor and on Bunting Stock Bronze Bearings and Bars. The very highest standards of metallurgical and manufacturing processes assure uniform high quality in Bunting Cast Bronze and Bunting Sintered Powdered Oil-filled Bronze Bearings and Bars. Bunting distributors are the leading responsible distributors in their respective areas. They carry ample stocks at all times.

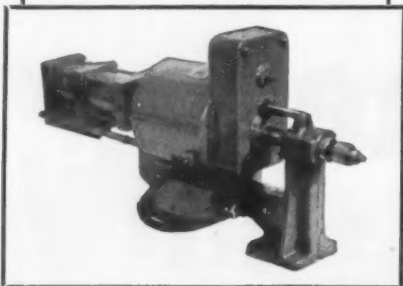
Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

Bunting

**BUSHINGS, BEARINGS,
BARS AND SPECIAL PARTS
OF CAST BRONZE AND
POWDERED METAL.**

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities
For more data circle 534 on Reader Service Card

AUTOMATIC DRILLING UNITS FOR AUTOMATION



MODEL 111— $\frac{3}{2}$ " capacity
1,000 to 10,000 RPM or
2,500 to 15,000 RPM.
Continuously variable speed
control.

MODEL 113— $\frac{1}{4}$ " capacity
15 Speeds—750 to 15,800
RPM.

MODEL 603— $\frac{1}{2}$ " capacity
600 to 4,000 RPM with
Variable Sheaves.

- **ELECTRIC MOTOR SPINDLE**
- **AIR HYDRAULIC FEED**

Write for More Descriptive Bulletin

The ELECTRO-MECHANO Co.
265 E. Erie St. Milwaukee 2, Wis.

For more data circle 535 on Reader Service Card

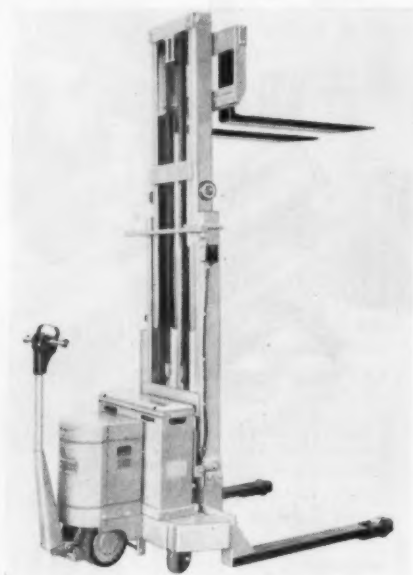
262 modern machine shop

new shop equipment . . .

for greater maneuverability in limited areas. The truck is made in 2,000, 3,000 and 4,000 pound capacities. The telescopic lift is to 128 inches.

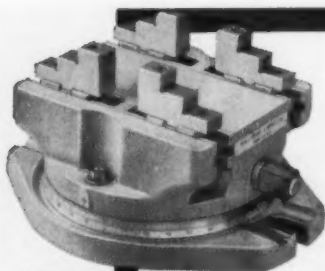
The following are among the features of this truck: two driving wheels, braking with the handle in any position; automatic parking brake (optional); sealed alloy gears; sealed ball bearing rollers in masts; 100 per cent more steering ease with two wheel drive; power unit removal complete in 20 minutes or less; and greater tire capacity equivalent load ratings. Its versatility in handling all types of materials and its dependability under all conditions are claimed to make this an ideal lift stacker for all types of industrial uses.

For more data circle 122 on Reader Service Card

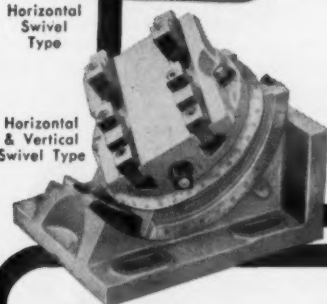


Model KHL Hydroelectric High Lift Truck

August, 1957



Horizontal
Swivel
Type



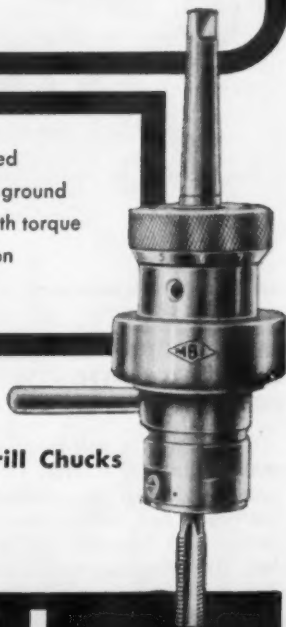
Horizontal
& Vertical
Swivel Type

Multi-Purpose Vises

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Rigid in any position. Various capacities and extra soft jaws available.

Reversible Safety Tapping Attachments

with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout.



Tested for Performance to American Standards

ALSO AVAILABLE:

- Dial Vernier Calipers • Keyless Drill Chucks
- Quick Change Chucks & Collets

Immediate Delivery From N.Y. Stock.

DISTRIBUTOR INQUIRIES INVITED



Write for
Descriptive Booklet
and prices.

Our Headquarters
in New York City



M.B.I. export & import Ltd.

A Division of Machinery Builders Inc.

475 GRAND CONCOURSE, BRONX 51, NEW YORK

Phone: MOtt Haven 5-0900

"Over 25 years experience in designing and building machinery"

For more data circle 536 on Reader Service Card

August, 1957

modern machine shop 263

DIMENSIONAIR . . . Only Dimensional Air Gage with

built-in accuracy that enables use of one master



Here's the air gage that does not drift. Its graduated scale is positively linear and can be depended upon to remain stable. Another great advantage of the Dimensionair system is the simplicity and positive directness with which the gage is set to zero, without trial and error adjustments.

In every way the Dimensionair provides you with constant accuracy and greater dependability, adaptability and service. That's why more and more inspection people buy it. To try it, write or call our nearest office.

FEDERAL PRODUCTS CORPORATION
7148 Eddy Street • Providence 1, R. I.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic - for Inspecting, Measuring, Sorting, or Automation Gaging

For more data circle 537 on Reader Service Card

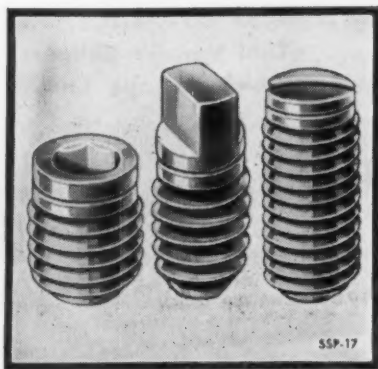
★ ★ ★ ★ ★

new shop equipment . . .

SELF-LOCKING SET SCREW ELIMINATES NEED FOR PRECISE TAPPING

Crest-Lok, a self-locking set screw that utilizes a unique locking action provided by an unthreaded portion of the crest, has been announced by Set Screw and Manufacturing Co., Bartlett, Ill. Advantages claimed for Crest-Lok are that this self-locking set screw eliminates the need for precise hole tapping, that the amount of locking action can be controlled by simply changing the tap drill diameter and that repeated reuse does not appreciably affect the locking action. Locking action is provided by an unthreaded portion, a thread and a half high, at the crest of the set screw. This di-

ameter is approximately the pitch diameter size and tends to compress the crest of the threads in the tapped hole when driven to a flush position.



View of Crest-Lok Self-Locking Set Screws

According to the manufacturer, Crest-Lok Set Screws can be hopper fed through the Setko System for hopper feeding headless set screws in sizes as small as No. 2 (0.086 by $\frac{1}{8}$ inch).

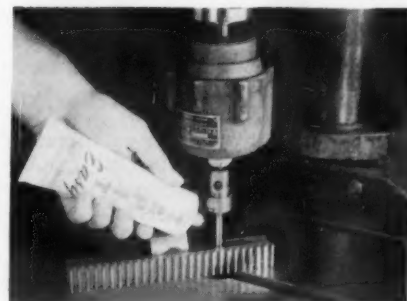
CrestLok Self-Locking Set Screws are available in any size headless set screw, socket, fluted, slotted and slotted, in Setko Nu-Cup and all other standard or special points.

For more data circle 123 on Reader Service Card

★ ★ ★

MODERN LUBRICANT INCREASES TOOL LIFE

The DoAll Co., Des Plaines, Ill., recently introduced its Tapit Compound, which is a threading and tapping lubricant that reduces the risk of tap breakage by providing a protective film between the tap and material. It is said to give unusual results in working with the newer, tougher alloys, in-



DoAll Improved Tapit Compound in use

cluding titanium and stainless steels. Tapit is not limited to tapping and threading operations; it can also be used for easier drilling, reaming, sawing, boring and broaching, while increasing tool life. It comes packaged in 8 ounce tubes and 1, 2½, 5 and 10 pound containers.

For more data circle 124 on Reader Service Card

★ ★ ★ ★ ★

JUST ANY GAGE IS NOT GOOD ENOUGH

Dimensions must be gaged in certain ways if you want accurate measurements. That's why Federal makes so many different types of gages of the same general kind. There are all degrees of accuracy required. And some measurements need more gaging pressure, and some less, and some need narrow anvils and some wide. Some want to gage just a hole diameter and some want to know if it's round or if it tapers.

There are many types of Federal Gages — send for catalog.

FEDERAL PRODUCTS CORPORATION
7148 Eddy Street • Providence 1, R. I.



Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

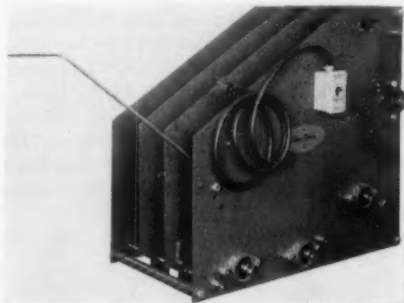
Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

For more data circle 538 on Reader Service Card

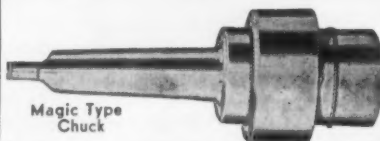
new shop equipment . . .

COIL CRADLE IS IMPROVED

The accompanying illustration shows the Model 1010 Coil Cradle, which has been recently redesigned by the Durant Tool Supply Co., Providence 3, R. I., to overcome many of the disadvantages found in coil cradle applications. This unit has a total of



Durant Redesigned Model 1010 Coil Cradle



**Magic Type
Chuck**

THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

"Call Collis For Service"

THE COLLIS CO.

Dept. A, Clinton, Iowa

For more data circle 539 on Reader Service Card

three power driven rolls plus two idling rolls to give complete support to coils of all diameters.

In addition, this model has two centralizing plates so that the coil of material is always in direct line with the power press and the roll feed, making it unnecessary to move the cradle for aligning the material.

A loading ramp is supplied with each cradle for easy loading of material. An off and on switch makes a positive electrical connection for operating the driving rolls when material is required by the punch press. This unit can be equipped with a stock oiler and pinch roll attachment, if so desired.

For more data circle 125 on Reader Service Card

GRIND THE *Eastern Centerless Way*

Our new plant with
increased facilities
assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

For more data circle 540 on Reader Service Card

**Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



Write for Circular
**NIELSEN TOOL &
DIE COMPANY**

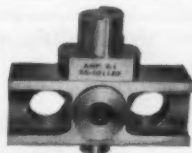
17360 Lahser Road, room 202
Detroit 19, Mich.

For more data circle 541 on Reader Service Card

NEW

**FLUSH PIN
AMPLIFIER**

**OFFERS 5 to 1
AMPLIFICATION**



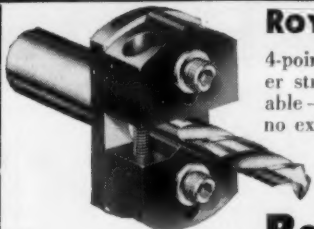
- No dial indicator needed • No master required
- Extremely rugged • Speeds up inspection • .001 to .010 tolerance range. WRITE FOR DETAILS.

HOLMES GAGE & DEVELOPMENT CORP.
Columbus 3, Ohio

For more data circle 542 on Reader Service Card

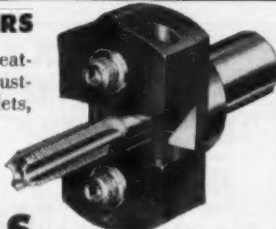
ROYEL TOOL HOLDERS

4-point holding provides greater strength. Completely adjustable — no bushings, no collets, no extra jaws.



Drill and reamer holder.

Write for literature.



Tap holders—releasing and non-releasing.

ROYEL TOOLS

4221 EXCELSIOR BLVD.
MINNEAPOLIS 16, MINN.

For more data circle 543 on Reader Service Card

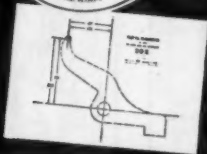
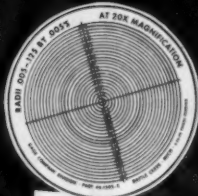
FOR ULTIMATE PROJECTION ACCURACY

Leitz

8" OPTICAL COMPARATOR PLUS

GAGE Deep-Etch

STANDARD OR SPECIAL CHARTS



COMPARATOR has:

- Vertical light beam
- 3 selective filters
- Indexing lens turret for 10, 20 & 50x
- Retractable Vertical Illuminator
- Circular, Protractor screen
- 2-dimensional horizontal stage
- Distortion guaranteed within less than 1/2 % (per mil.)

**DEEP-ETCH CHART SERVICE
MEANS:**

- Precision plastic
- Unbreakable
- Scratch-proof
- Selection of Standard Stock Charts
- Facilities for developing Special Charts

OPTO-METRIC TOOLS, INC.

137MM VARICK STREET • NEW YORK 13, N. Y.

Request 8-page catalog TP200

For more data circle 544 on Reader Service Card

new shop equipment . . .

OIL BASE ADDITIVES

A group of chemically formulated oil base additives called Cimcut Concentrates, which are added to mineral oils to form metal cutting oils, have been announced by the Cincinnati Milling Products Division, Cincinnati

BLANCHARD GRINDING

To 85" diameter and up to 20" x 120"

- 24 Hour Service
- Steel & Aluminum Plate, any size, shape or thickness
- Weldments
- Shear blades sharpened up to 10'.

SAL METAL PRODUCTS CO.

Dept. MM

120 Freeman St. Brooklyn 22, N. Y.
EVergreen 9-2560

For more data circle 545 on Reader Service Card



MARK OF QUALITY

STANDARD WOODRUFF KEYS

We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as 1/2" x 1/16" to keys as large as 3 1/2" x 3/4". All keys are carefully checked for burrs, slivers, etc., before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

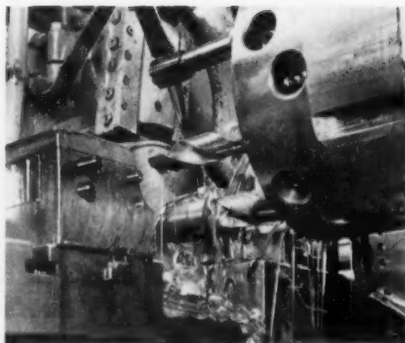
STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 546 on Reader Service Card



Cimcut AA Mixture being used for variety of work on an automatic screw machine

Milling Machine Co., Cincinnati 9, Ohio. These additives, Cimcut AA (general purpose), Cimcut NC (non-corrosive) and Cimcut SS (heavy-duty) have been designed principally for those operations where a cutting oil must be used. Cimcut Concentrates are mixed with readily available mineral oils in proportions varying from 1 to 20 per cent and can be obtained in either the concentrated form or preblended.

Cimcut AA Concentrate is a sulphur-chlorinated oil additive, which has chemically effective extreme pressure and polar lubricating properties. These chemical ingredients are claimed to give improved tool life and good finishes. Cimcut NC is a non-corrosive sulphurized oil additive and is particu-

**NEW NESTING TYPE
TOTE PANS**



Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 3, Conn.

For more data circle 547 on Reader Service Card



DEMAGNETISERS

SINGLE AND DOUBLE UNITS



are invaluable when tools or equipment become magnetised
Power consumption is only 60 watts.

ELISHA PENNIMAN Elmwood 10, Connecticut.

For more data circle 548 on Reader Service Card



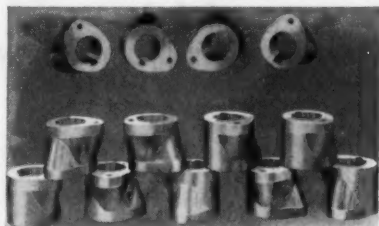
DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle 549 on Reader Service Card

We'll make the cams you need



Rowbottom for Cams

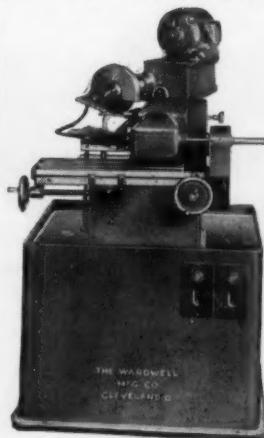
Investigate!

If you need cams in any type . . . box, barrel, side or cams hardened and ground . . . get the benefit of Rowbottom's long, specialized experience and complete service. We'll produce your cams or furnish the machines for making them. All types in any quantity. Send us your specifications.

THE ROWBOTTOM MACHINE CO.
Waterbury, Conn.

For more data circle 550 on Reader Service Card

90 FS Automatic Universal FLUTE GRINDER



...Grinds Tools Like These

from Solid!

Make your own twist drills, spiral or straight reamers and end mills from solids on a production basis and save money.

Descriptive Bulletin
90 FS—Free

We Also Manufacture
Automatic Millers for
Spiral Fluting

Also avoid costly delays when special drills or reamers are required. Make drills as small as 1/16". Indexes automatically. No special skill needed.



WARDWELL

3803 Ridge Road,
Cleveland 9, Ohio

For more data circle 551 on Reader Service Card

NIELSEN

Heavy Duty

Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

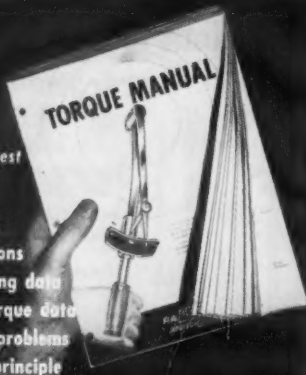
NIELSEN, INC. LAWTON, MICHIGAN

For more data circle 552 on Reader Service Card

"TORQUE WRENCH" MANUAL

Sent
upon request

Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principle



P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

For more data circle 553 on Reader Service Card

new shop equipment . . .

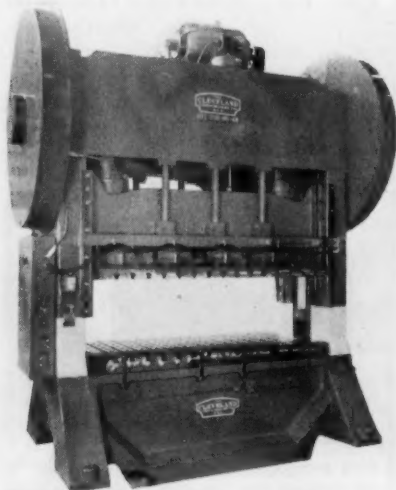
larly suited for non-ferrous metals because of its non-corrosive characteristics. Cimecut SS is a heavy-duty sulfurized oil additive for use on ferrous metals only. It has been designed for jobs with exceptionally low cutting speeds and extremely small tool clearances on steels with machinability ratings of 45 per cent or less.

For more data circle 126 on Reader Service Card

★ ★ ★

STRAIGHT SIDED DOUBLE CRANK PRESS AVAILABLE IN VARIETY OF CAPACITIES

The Cleveland Punch and Shear Works Co., 3917 St. Clair Ave., Cleveland 14, Ohio, has introduced a 200 ton single geared, double crank, straight sided press, which is equipped with twin drive and an electrically con-



Cleveland Single Geared Double Crank Straight Sided Press equipped with twin drive

JIG BORING

and

Large Precision Machining

Done to your specifications

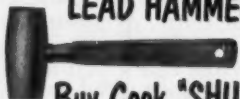
We have 22 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 554 on Reader Service Card

LEAD HAMMERS—



Buy Cook "SHUR-GRIP"

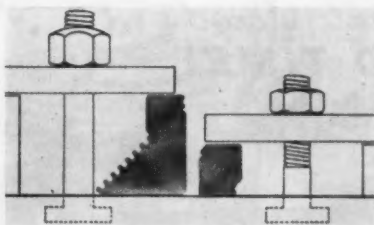


They're a MUST in every shop where many blows have to be struck without marring surfaces. Available with "SHUR-GRIP" drop forged handles.

Write for circular and prices
LAWRENCE H. COOK, INC.

67 MASSACHUSETT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 555 on Reader Service Card



MERMOD SET-UP BLOCKS

- Adjustable in steps of 1/25"
- Rounded teeth fit and mate perfectly
- Case hardened and tempered steel

ELIMINATE HUNTING FOR PROPER STRAP SUPPORTS AND REDUCE SET-UP TIME TO A FRACTION

Eliminate inaccuracies and accidents due to improper strapping

WHY NOT INCREASE YOUR PRODUCTION, ACCURACY AND PROFITS?

Sole U.S.A. Representatives:



KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

For more data circle 556 on Reader Service Card

August, 1957

What is your



LUBRICATING PROBLEM?

- ☐ LATHE CENTER LUBRICATION
SCORING-GALLING
- ☐ GRINDING CENTERS
LUBRICANT WASHOUT
- ☐ DRAWING
SCORE MARKS-DIE WEAR
- ☐ STEADY RESTS
WORK PIECE DAMAGE
- ☐ PRESS FITS
SCORING-SEIZING
- ☐ DIE POSTS
WEAR-FREEZING



CMD Lube has solved many like it with excellent results. Perhaps CMD will be your answer, too!

**CHECK AND
SEND IN FOR
SAMPLE**

Anti-Scoring Lubricant
**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

1910 West 46th Street, Chicago 9, Illinois

For more data circle 557 on Reader Service Card

modern machine shop 271

For more data circle 553 on Reader Service Card

270 modern machine shop

**Cleveland Single Geared Double Crank
Straight Sided Press equipped with twin drive**

August, 1957

new shop equipment . . .

trolled heavy-duty drum type friction clutch with air brake. The flywheel has an auxiliary air brake to enable quick stop when the power is suddenly shut off. The press has an 8 inch stroke, 10 inch adjustment of slide, shut height of 30 inches, slide or plunger face of 48 by 96 inches and a 33 by 81 inch bed opening.

The Cleveland Straight Sided, Double Crank series is available in 75, 90, 110, 120, 150, 200, 250 and 350 ton capacities, and can be modified in respect to die space, stroke, adjustment, bed area and so on. The variety of sizes and capacities, in which these presses are available, allows any thickness of material from light sheet metal to heavy steel plate. The presses are built in single geared, double geared and flywheel types, and can be used

in such operations as punching, forming, stamping, bending, cutting and light embossing—usually of large or irregular shapes. Twin drive is used on the larger presses and is recommended wherever the work is particularly heavy.

For more data circle 127 on Reader Service Card

★ ★ ★

LATHE CHUCK IS 66 INCHES IN DIAMETER

Horton Chuck Division, Greenfield Tap and Die Corp., Windsor Locks, Conn., has announced the recent completion of a lathe chuck that is claimed to be the largest of its type ever produced.

This huge J type chuck is 66 inches in diameter and was manufactured particularly for use in machining jet engine components requiring the utmost in accuracy. The accompanying

★ ★ ★ ★ ★

Cuts Tubing to Accurate Lengths In **-SPLIT-SECOND TIME!**

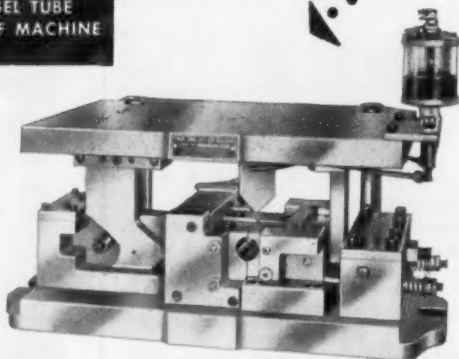
LENGTHS of 1/2 inch or more are accurately cut to $\pm .010''$ with each stroke of press—actually less

than 1/2 of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to 1/2" O.D. with 3/32" wall; the No. 2 takes tubing up to 2" O.D. with 1/8" wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

**VOGEL TUBE
CUT-OFF MACHINE**



PATENTED

VOGEL

TOOL AND DIE CORPORATION

1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

For more data circle 558 on Reader Service Card

For more data circle 556 on Reader Service Card
August, 1957



**TRY
"Standard"
DIE MAKERS
GREASE AT OUR EXPENSE**

By actual independent laboratory test, this grease has proved to have lubricating qualities unequalled by any other lube. Write on your company letterhead for FREE sample tube.

STANDARD DIE SET MFRS., INC.
1503 Elmwood Ave., Providence 7, R. I.



**Here's
the
dope!**

**TAMMS
BLUE
LAYOUT
DOPE**

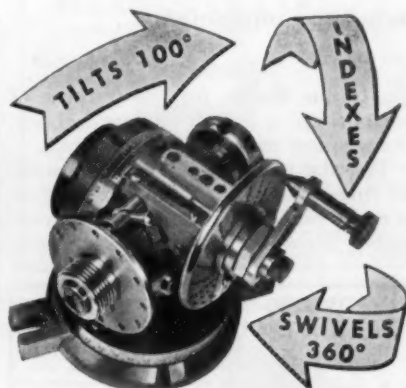
TAMMS INDUSTRIES, INC.
228 N. La Salle St., Chicago 1, Ill.

**WRITE
for
SAMPLE**

**DRYS FAST-RESISTS OIL
WON'T CHIP, CRACK OR FLAKE OFF!**

For more data circle 559 on Reader Service Card
August, 1957

1910 West 46th Street, Chicago 9, Illinois
For more data circle 557 on Reader Service Card
modern machine shop 271



FOR FASTER PRODUCTION

THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

**N
NICHOLS MORRIS
M
CORPORATION**

76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

For more data circle 560 on Reader Service Card
modern machine shop 273

tubing can be sheared with this machine.

VOGEL

TOOL AND DIE CORPORATION

1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

For more data circle 558 on Reader Service Card

272 modern machine shop

August, 1957

new shop equipment . . .

illustration shows, for the purpose of comparison, a 3 inch universal chuck, the smallest made by the company.

The ability to center large thin wall rings and parts, without distortion, is made possible with a controlled centering pressure device. In operation,

New 1957 Model "55"

RADIUS DRESSER



OUTPERFORMS THEM ALL
Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns 'tricky' jobs into routine operations.

Low Price \$124.50 with Diamond

Write for free illustrated folder

SOMERSET TOOL CO.
320 Virginia St. Hillside, N. J.

For more data circle 561 on Reader Service Card



Peaslee ACTUAL SIZE

PRECISION MINIATURE PINS

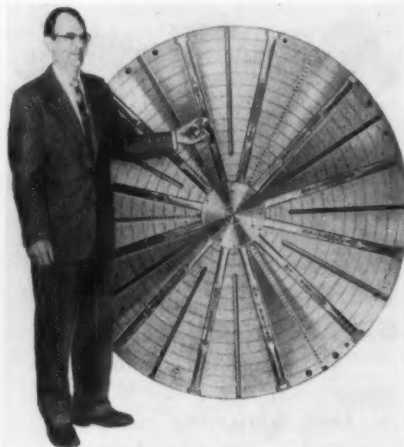
Our quantity production of standard-size, precision, stainless-steel pins is now expanded to miniature pins. Tolerances are held to .0002 on dia. Sizes run as small as .020 dia. x 1/4". Both straight and taper styles are produced, with taper pins ranging down to 9/0. We specialize on stainless-steel, instrument-type pins. Send your blueprints for prompt quotation.

THE PEASLEE METAL PRODUCTS CO.

470 Tolland Street • East Hartford 8, Conn.

For more data circle 562 on Reader Service Card

274 modern machine shop



Horton Chuck is 66 inches in diameter

three universal jaws move in toward the workpiece. Upon contact, the jaws stop automatically. The 12 independent jaws are then moved in to pinch the part in its "as is" position. This feature, incorporated in the company's line of J type chucks, is said to permit quick, precision centering and chucking, eliminating work damage caused by excessive centering pressure.

Also featured on this chuck are spring steel chip guards which prevent chips and dirt from entering any of the jaw way openings. The chip guards travel with the jaws, keeping the ways covered at all times, regardless of jaw position.

These large J type chucks are available in sizes ranging from 21 to 66 inches in diameter.

For more data circle 128 on Reader Service Card

CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 563 on Reader Service Card

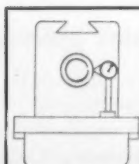
August 1957

**DRYS FAST-RESISTS OIL
WON'T CHIP, CRACK OR FLAKE OFF!**

For more data circle 559 on Reader Service Card
August, 1957

CORPORATION
76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

For more data circle 560 on Reader Service Card
modern machine shop 273



Used by U. S. Armed Forces

MACHINE TOOL RECONDITIONING

and the Art of Hand Scraping (2nd printing). Send for free folder describing illustrated book.

MACHINE TOOL PUBLICATIONS

324 Wabasha, 215 Commerce Bldg.
St. Paul 1, Minn.

For more data circle 564 on Reader Service Card

HARGRAVE CLAMPS

Complete Line of Clamps for all Purposes

Individually
Power Tested
for Better
Performance.



"C", Steel Bar,
Quick Acting,
Wood Hand
Screws, Welders

WRITE FOR FREE CATALOG.

Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers, Carbide Drills, Washer Cutters, and File Cleaners.

Stocked by Your Local Distributor.

THE CINCINNATI TOOL COMPANY

1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 565 on Reader Service Card

A SMALL saw with LARGE capacity

MODEL A—Capacity 6" x 11" with BIG machine features. Rugged construction. Precision saw guides. Adjustable cutting pressure and rate of descent. Quick action swivel vise. 1/2" blade. Rotary blade brush. Automatic blade shut-off. 1/2 H.P. motor with overload protection. Table available to use saw vertically for contouring, notching, and slotting!

Send for FREE CATALOG.

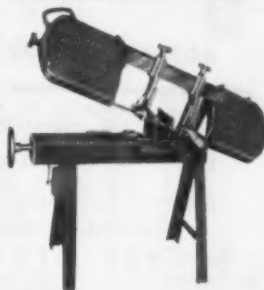
Dept. M.

W. F. Wells and Sons
Metal Cutting Band Saws



THREE RIVERS
MICHIGAN

Model A



For more data circle 566 on Reader Service Card

Cut TAPPING AND REAMING Costs!

One sure way of cutting tapping and reaming costs is to reduce the time required to make the set-ups. And this is where the Ziegler Tool Holder really shines!

With ordinary tool holders it is a time-consuming job to align the work accurately with the spindle. But with the Ziegler all that is necessary is to align it to within 1/32" of accuracy and the holder automatically does the rest.

Besides reducing set-up time, it also produces better work. Investigate! It will pay you in dollars saved.

PROMPT DELIVERY



Types to fit
any machine
used for
tapping or
reaming.



FLOATING HOLDER
for Taps and Reamers...

W. M. ZIEGLER TOOL CO.

13566 AUBURN
DETROIT 23, MICH.

WRITE FOR
CATALOG

For more data circle 567 on Reader Service Card

August, 1957

modern machine shop 275

steel, instrument-type pins. Send your blue-prints for prompt quotation.

THE PEASLEE METAL PRODUCTS CO.

470 Tolland Street • East Hartford 8, Conn.

For more data circle 562 on Reader Service Card

274 modern machine shop

ard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 563 on Reader Service Card

August, 1957

.0003 HOLE LOCATION IN 1 MINUTE

EDGE FINDERS

**\$2.50
NEW**

**POSTPAID
except C.O.D.**

**\$10.00
DELUXE**

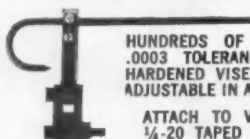


- THOUSANDS HAVE PROVEN and ACCEPTED THE DELUXE MODEL FOR YEARS.
- JUMPS SIDEWAYS AS SHOWN WHEN LOCATION IS REACHED

← NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200 DIA.



ADJUSTABLE VISE STOP



\$2.95

HUNDREDS OF PIECES TO A .0003 TOLERANCE WITH THIS HARDENED VISE STOP THAT IS ADJUSTABLE IN ALL DIRECTIONS.

ATTACH TO VISE WITH ONE 1/4-20 TAPED HOLE.

Dealer inquiries invited

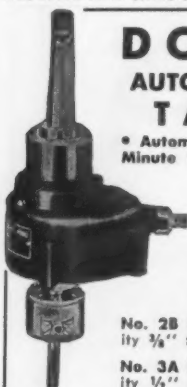
GLOVER MFG. CO.

422 Park Ave.

Meadville, Penna.

For more data circle 568 on Reader Service Card

DORMAN AUTOMATIC REVERSE TAPPERS



- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to 3/8" in Steel — 1/2" in Aluminum.

No. 2B POSITIVE TAPPER — capacity 3/8" to 7/8" in Steel.

No. 3A POSITIVE TAPPER — capacity 1/2" to 1 1/4" in Steel — 1/4" to 3/4" Pipe Taps.

No. 4A TAPPER — capacity 3/4" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from
\$62.00

Write for
Bulletin

**IMMEDIATE
DELIVERY**

THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1034 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 569 on Reader Service Card

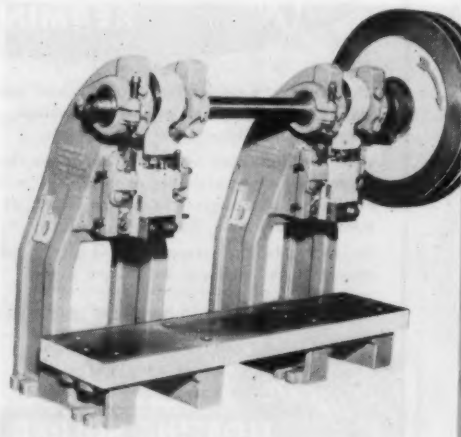
276 modern machine shop

new shop equipment . . .

SMALL PRESS BRAKE

Benchmaster Manufacturing Co., 1835 West Rosecrans Ave., Gardena, Calif., has custom designed, to perform the functions of a small press brake at considerable savings in cost, an adaptation of two small Benchmaster Presses. The multiple ram setup consists of two 5 ton fixed Bed Gap Frame Benchmasters operating in tandem from a single crankshaft common to both presses. The two press frames are separated by 18 1/2 inches between ram centerlines and are held in alignment by a single bolster plate measuring 37 inches long by 8 inches wide and 1 1/2 inches thick. The crank has a stroke of 1 1/8 inches and operates at 230 strokes per minute. Total tonnage developed is 10 tons. With this type of construction any normal separation of press frames is practical, making for wide flexibility of overall bed capacity and easy adaption to an almost unlimited variety of workpieces.

For more data circle 129 on Reader Service Card



Two Benchmasters serve as small press brake

August, 1957

COATED OPTICAL FLATS

The Van Keuren Co., 175 Waltham St., Watertown, Mass., has announced a line of precision metallic coated optical flats, referred to as Micro-Koted Flats. These are fused quartz optical flats which have been coated with a hard transparent metallic material. The manufacturer states that the coating is very durable and will not peel or rub off. Among the advantages of Micro - Koted Flats are: improved accuracy—the width of the dark fringe is less than half the width of ordinary fringes, or equivalent to about 0.000001 inch of height; the fringe boundaries are also more clearly defined and the familiar fuzzy borders are practically eliminated; improved contrast for greater ease in observing fringes (especially on highly reflective work); and long life.

The accompanying illustration demonstrates

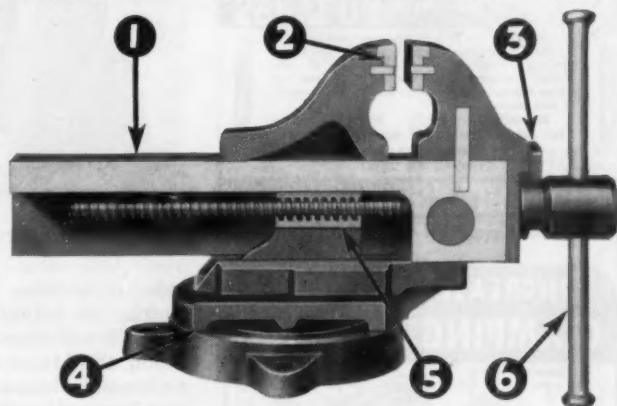


Van Keuren Micro-Koted Optical Flat

some of the advantages of Micro-Koted Flats. Here an optical flat is being used to measure the flatness of an amplifying gage anvil. The upper left side of the flat has been Micro-Koted; the lower right side is untreated. The difference in the bands can be noted. It is estimated that readability of coated flats is five times that of uncoated flats, provided the work surface is reasonably reflective.

For more data circle 130 on Reader Service Card

extra vise features



no extra cost

It makes sense to standardize on Desmond-Simplex vises. You pay no more, but you get more: 1. All-steel slide, milled from "the solid." 2. Step-milled jaw inserts. 3. Outside screw retainer. 4. Full 360° swivel base. 5. Longer, stronger vise nut. 6. Non-pinching type handle. Write for catalog and name of your Desmond distributor.

Desmond-Simplex STEEL SLIDE VISES

THE DESMOND-STEPHAN MFG. CO., Urbana, Ohio

For more data circle 570 on Reader Service Card

For more data circle 569 on Reader Service Card

276 modern machine shop

Two Benchmasters serve as small press brake

August, 1957

new shop equipment . . .

PRESS HAS CAPACITY OF 150 TONS

The Johnson Machine and Press Corp., 620 West Indiana Ave., Elkhart, Ind., is now manufacturing an open back inclinable press of 150 ton capacity. Known as the Model No. 150, the press conforms to J.I.C. stand-

CUT TOOL COSTS

broken tools made like new again with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING!

NO SHORTENING!

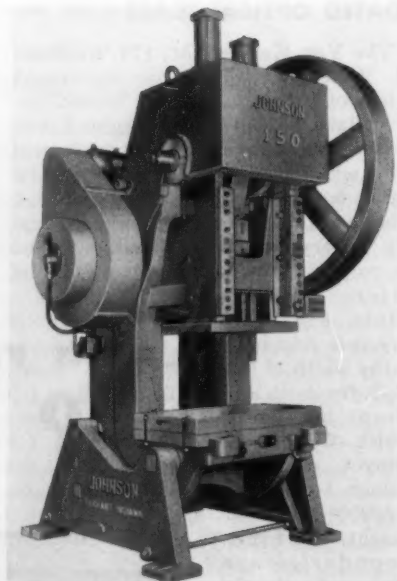
NO SLEEVES!

NO DISTORTION!

GUARANTEED STRONG AS NEW!

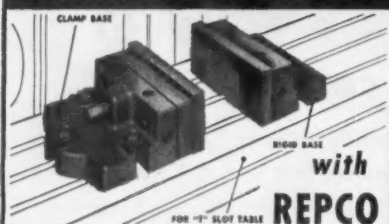
Send them to us like this! **NU-TANGS** INC. 1339 Bates Avenue Cincinnati 25, Ohio *We return them like this!*

For more data circle 571 on Reader Service Card



Johnson Model 150 Open Back Inclinable Press

INCREASE AVAILABLE CLAMPING CAPACITY



2-Piece Machine Vise Set

Cuts costs . . . supplements use of one-piece vises. Machined for precision accuracy.

- Two Sizes — 6" and 8" widths. Depth 2½". T-Slot center distances: 2¼" - 2¾", 2¾" - 3¾".
- Greater Versatility — useable as general purpose vise, as an angle block, as separate clamping device.

Write for Bulletin 100 - Dealer Inquiries Invited

ROCKFORD ENGINEERED PRODUCTS CO.
2324 23rd Avenue • Rockford, Illinois

For more data circle 572 on Reader Service Card

278 modern machine shop

ards. It features a box type ram, air clutch, air actuated spring set brake and 110 volt electrical controls. In addition, the Model 150 is equipped with replaceable bronze inserts at Pitman and Journal bearings. The press offers a standard die space of 22 inches and a maximum of 39 inches is available on special order.

Offered exclusively in the geared type, the Model 150 has a standard

FROIL Rust Preventive OIL

✓ Positive barrier against corrosion that lasts for MONTHS

✓ Protects any metal—even delicate MICRO-finishes

✓ Eliminates fingerprint damage and water spotting.

Write for Data Sheet No. RP-100 "FROIL FOILS RUST"

15 BANK STREET
STATEN ISLAND 1, N. Y.

For more data circle 573 on Reader Service Card

August, 1957

6 inch stroke with up to a maximum 12 inch stroke available. It has a flange ram face and box type ram which measures 34 by 24 inches. The bolster plate is 50 by 30 by 4½ inches and the opening through the uprights is 26 inches.

For more data circle 131 on Reader Service Card

★ ★ ★

PIPE SEALING DEVICE RESISTS CORROSION

A new surface treatment, which offers unusual resistance to corrosion, has been announced by Flick-Reedy Corp., Tru-Seal Division, 2024 North Hawthorne, Melrose Park, Ill., for its Tru-Seal Self-Sealing Pipe Fitting.

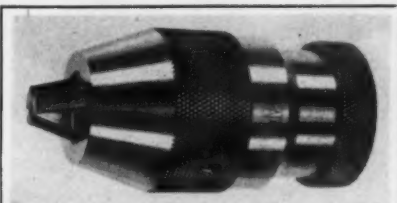
Edges of the nut-like fitting, designed to stop leaks at threaded pipe connections, have also been cropped and rounded off to make the device more compact. The device seals by means of a threaded Teflon plastic insert.

The manufacturer states that these fittings with the new gold colored finish — a chromated cadmium surface treatment—have successfully withstood the 100 hour salt spray test of the Steel City Testing and Engineering Laboratories. The test duplicates a lifetime of operation under the most punishing conditions.

According to the manufacturer, the unit holds its seal under ultimate

pressures of 10,000 pounds per square inch, and under temperatures ranging from minus 200 to plus 500 degrees F. The milky-white plastic insert is inert to virtually all known chemicals and can be used in pipe circuits carrying oil, water, gas, air, steam, chemicals and in vacuum lines.

The cropped corners of the unit give it a smaller outer diameter and pre-



THE RAPID

A Superior Swedish Drill Chuck
For the finest JIG BORERS
or other machines
WHEREVER UTMOST AVAILABLE
ACCURACY COUNTS

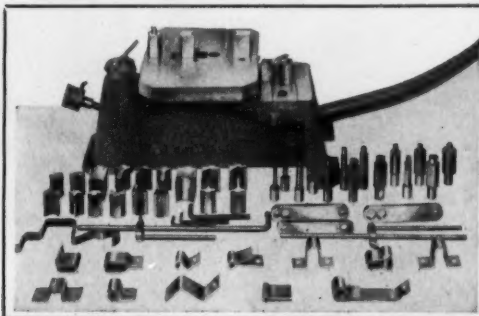
- Automatic tightening and self centering with load
 - Easy to open—No Key to misplace or to invite accidents
 - No chewed up tool shanks
 - All parts properly hardened and Precision Ground
 - Arbors Precision Ground between centers
- The Chuck of TODAY for the most demanding operators!

Sole U.S.A. Representatives

NEISE
MODERN TOOLS

KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

For more data circle 574 on Reader Service Card



Multiform

BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO
¼" to 4" MATERIAL

Write for brochure which illustrates
and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M Kalamazoo, Mich.

For more data circle 575 on Reader Service Card

**HIGHER SPEEDS!
FASTER GRINDING!**

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰

IN U.S.A.



Weight 12 ounces;
length 6 $\frac{1}{4}$ inches;
chuck size $\frac{1}{8}$ inch.
Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

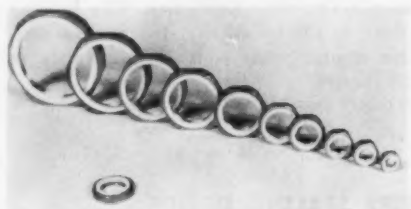
MADISON-KIPP CORP.

208 Waubesa St., Madison 10, Wis., U.S.A.

For more data circle 576 on Reader Service Card

280 modern machine shop

new shop equipment . . .



Various sizes of Tru-Seal Pipe Fittings

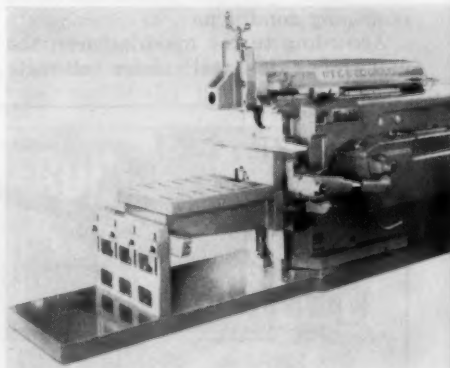
vent overtightening during installation, since there is less area for the wrench to grip.

For more data circle 132 on Reader Service Card

★ ★ ★

36 INCH RIGID SHAPER

The Cincinnati Shaper Co., Cincinnati 25, Ohio, recently introduced a 36 Inch Heavy Duty Rigid Shaper, equipped for machining internal gate valve guides. Features of this machine include automatic power downfeed to the special ram head, special clearance table to accommodate large castings and an extended steel baseplate.



Cincinnati 36 Inch Heavy Duty Rigid Shaper

August, 1957

new shop equipment . . .

The work is secured to the cross slide of the mechanical follower gage.

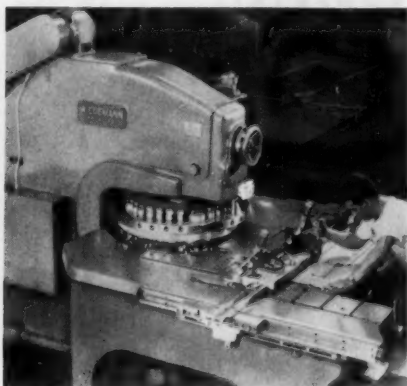
Maximum rigidity is provided by slot free ram and extended ram bearing construction. Exclusive 50 p.s.i. automatic lubrication system maintains a pressured oil film at all important moving connections. Brushless electromagnetic clutch and brake with fingertip control simplify operation and reduce operator fatigue.

For more data circle 133 on Reader Service Card

★ ★ ★

TURRET PUNCH PRESS WITH HIGH SPEED FOLLOWER GAGE

It is claimed that high speed piercing of truck parts, heavy electronic chassis, panels, side plates and other sheet metal or plate parts in low to medium production quantities can be done at 60 to 90 per cent savings with the RA-61 Turret Punch Press manufactured by the Wiedemann Machine Co., Dept. 602, 4219 Wissahickon Ave., Philadelphia 32, Pa. This 40 ton capacity press, equipped with the Wiedemann High Speed Follower Gage (pantograph), is said to eliminate setup and work layout. Flat sheet metal or plate up to 33 by 40 inches is pierc-



Wiedemann RA-61 Turret Punch Press in use

August, 1957

for as little as
\$22.00
COMPLETE
IN U.S.A.

Get This Production Boosting

'TRICO-MIST' COOLANT SYSTEM



For drilling, tapping, milling, sawing, grinding, etc. Quickly removes heat from cutting edges permitting substantial increase in cutting speeds, finer finishes and accuracy. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls volume of mist spray. Attaches to shop air line. Available with one and five gallon containers—single or multiple outlets—single or dual valve control.

SEND FOR BULLETIN 37-A.

TRICO FUSE MFG. CO.
MILWAUKEE, WIS. U.S.A.

For more data circle 577 on Reader Service Card
modern machine shop 281

nounced an improved precision hardened and ground micrometer adjustable spacing collar for milling machine

Ill., claims that increased quality of the steel used in its pipe and tube cut-off wheels has resulted in an increase in

new shop equipment . . .

ed at the rate of 30 or more holes per minute.

The power operated RA-61 provides maximum flexibility in shape and size of punches and dies which can be used. Its rotating turrets house 20 to 28 tools which can be brought into piercing position in 3 to 5 seconds.

48-HOUR magnetic CHUCK REPAIR SERVICE —any electrical chuck!



GUARANTEED FOR ONE YEAR

—just as are new Magna-Lock magnetic chucks

A FIRST-CLASS JOB BY EXPERTS!

Whether your electrical magnetic chuck requires a minor repair or a complete overhauling, it will receive the same exacting care and attention, regardless of make, which go into the manufacture of new Magna-Lock magnetic chucks. Coil winding, dipping, evacuating and impregnating are done by skilled workers using the finest equipment available. And, your chuck is thoroughly tested before it is returned to you.

It will be right the first time — and will cost you less!

FOR FAST ACTION PHONE 815

Hanchett MAGNA-LOCK CORPORATION BIG RAPIDS, MICHIGAN, U.S.A.

designers and makers of a complete line of magnetic chucks and devices.

For more data circle 578 on Reader Service Card

282 modern machine shop

The work is secured to the cross slide of the mechanical follower gage. Therefore, it accurately follows the slide in any direction as the operator moves the control stylus from hole to hole in a color coded template clamped to the table. When the stylus point enters a small diameter hole in the template, the work is properly positioned and the press automatically trips. This heavy duty press with a throat depth of 33 inches will punch holes up to 6 inches in diameter in $\frac{1}{8}$ inch mild steel or up to $1\frac{1}{2}$ inches in diameter in $\frac{3}{8}$ inch mild steel. Larger square or rectangular openings can be produced with a series of hits.

For more data circle 134 on Reader Service Card

★ ★ ★

SPACING COLLAR

The Dayton Rogers Manufacturing Co., Minneapolis 7D, Minn., has an-



Dayton Rogers Adjustable Spacing Collar

August, 1957

nounced an improved precision hardened and ground micrometer adjustable spacing collar for milling machine cutter arbors. The sizes range from $\frac{5}{8}$ inch to 3 inches for all standard cutter arbors.

The outer barrel of the collar is so marked that it can be adjusted plus or minus against the thousandth graduations of the inner barrel by means of a furnished spanner wrench. The graduations are so spaced that 0.001 adjustment can be readily obtained, assuring positive adjustment when the collars and cutters are locked on a given arbor. These collars are claimed to be particularly adapted where gang milling machine cutters are in operation.

For more data circle 135 on Reader Service Card

★ ★ ★

PIPE AND TUBE CUT-OFF WHEELS

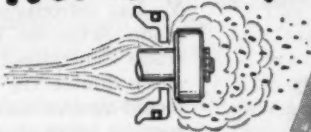
Continental Machine Co.,
1952 North Maud Ave., Chicago 14,



Continental Pipe and Tube Cut-Off Wheels

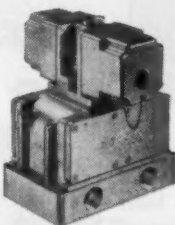
Ill., claims that increased quality of the steel used in its pipe and tube cut-off wheels has resulted in an increase in the number of cuts between sharpenings. For the past year all wheels produced by the company used Hi-Alloy Shok-Resisto Steel. Results of a recent survey of concerns using these wheels during this period indicates such a strong preference for this shock resistant steel that the older, standard

Not Hurt by Dirt!



Poppet seats, cleaned on each cycle... prolong valve life... eliminate costly maintenance

another
Plus Value



NOPAK-MATIC valves

reduce maintenance and downtime! Nopak-matic poppet-type air control valves are designed to tolerate dirty air and keep going. New design and materials insure millions of trouble free cycles.

Other NOPAK-MATIC Features

- Exclusive "Flow-Director" pilot heads for greater valve versatility.
- Complete pilot head interchangeability.
- Replaceable, self-cleaning seats.
- New design for fast maintenance.
- 100% J.I.C. conformance at no extra cost.
- Simplified piping.

SEND FOR CATALOG 105

NOPAK VALVES and CYLINDERS

GALLAND-HENNING NOPAK DIVISION • 2758 S. 31st St., Milwaukee 46, Wis.

For more data circle 579 on Reader Service Card

August, 1957

modern machine shop 283

The headstock has 24 speeds with a speed range ratio of 1:200. For fine turning, a special vibration free drive

**PORTABLE COOLING SYSTEM
PROLONGS TOOL LIFE**

new shop equipment . . .

steel for rotary wheel use has been discontinued from the line by the company's steel mill source.

Wheels come in standard bevels, $\frac{1}{8}$ inch thick for pipes and tubes up to 3/16 inch wall thickness; long bevel, 3/16 inch thick wheel for 7/16 inch walls; and tube bevel, $\frac{1}{8}$ inch thick wheel for light wall tubes up to 16 gauge wall thickness.

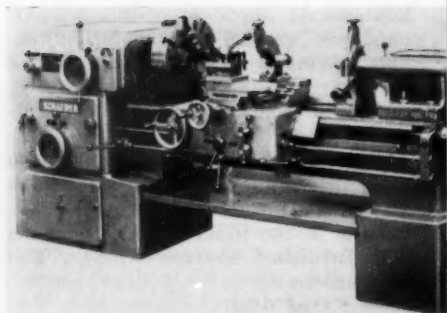
The company offers a free Hi-Alloy wheel to companies desiring to make their own wheel longevity comparisons. For more data circle 136 on Reader Service Card

★ ★ ★

LATHE WITH SADDLE AND APRON CAST IN ONE PIECE

Aaron Machinery Co., Inc., Dept. M, 45 Crosby St., New York 12, N.

★ ★ ★ ★ ★



Schaerer Lathe features centralized lubrication and underslung double vee guide bed

Y., has introduced its line of German made Schaerer Lathes. Features include centralized lubrication; underslung double vee guide bed, fully protected against damage for long life; automatic lubrication, easy maintenance, easy cleaning; swing from 20 to 44 inches; and bed lengths to 35 feet.

CONTINENTAL
Certified Drills

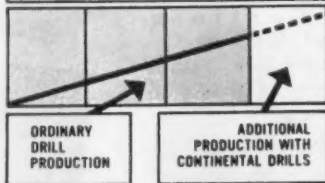
PRECISION

MORE HOLES PER DRILL

Today's drilling problems on both standard and new metals require twist drills with *something extra* built into them. That's why Continental drills are so acceptable to leading cost conscious production plants.

Ask your industrial jobber

MAJOR PRODUCTION PLANTS PROVE
CONTINENTAL DRILLS LAST LONGER!



NEW YORK
50 Church Street
CO 7 5662

WAREHOUSES:

LOS ANGELES
6551 Whittier Blvd.
RA 3-1287

TACOMA, WASH.
2006 Center Street
MA 7 3434



CONTINENTAL DRILL CORPORATION

555 W. Adams St., Chicago 6, Illinois

LET
COUNT MOREHOLES
SHOW YOU HOW
TO CUT COSTS



For more data circle 617 on Reader Service Card

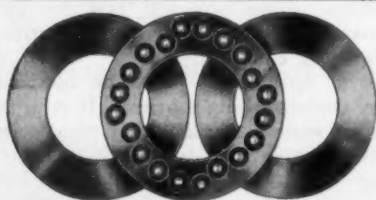
The headstock has 24 speeds with a speed range ratio of 1:200. For fine turning, a special vibration free drive is obtained by use of the Schaerer spindle clutch. The hardened main spindle has a large bore, and is mounted in vibration free precision bearings, with short bearing centers. The feed and thread cutting device is a plain adjustable gear drive, completely enclosed. The feeds and thread pitches are easily set by means of a hand-wheel with a graduated dial.

The electrical switch gear is built into the machine and is easily accessible. The drive motor is a standard foot mounted motor.

The saddle is characterized by its long guideways. The saddle and apron are cast in one piece.

The bed has underslung double vee guides so arranged as to be protected against damage by swarf.

For more data circle 137 on Reader Service Card



All kinds of BALL & ROLLER THRUST BEARINGS

Flat . . . self aligning . . . double action . . . grooved . . . double direction. Can make bearings up to 25" diameter. Also equipped to repair and regrind bearings.

Immediate delivery on most bearings.

ACORN BEARING COMPANY

(Established 1917)

68 Stanley Street

New Britain, Conn.

For more data circle 500 on Reader Service Card

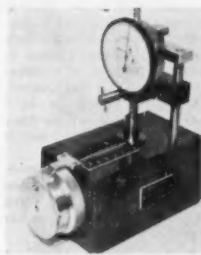
August, 1957

PORTABLE COOLING SYSTEM PROLONGS TOOL LIFE

The Spray-Cooler, an easily portable cooling system for metalworking machines, has been introduced by the Triple-E Engineering Co., Racine, Wis. Employing the spray cooling principle, whereby finely atomized particles of coolant are directed at the point of cutting, the unit has been successful in prolonging tool life. The fact that heat is removed almost instantaneously means that tools stay sharp longer, resulting in finer finishes and permitting increased operating speeds of metalworking machines.

The unit operates on compressed air from the normal factory air source—any pressure from 50 to 125 p.s.i. The compressed air passing through a tube, enclosed in a flexible metal hose, siphons coolant from the 1¼ gallon tank. Coolant and air are mixed in the proper ratio (depending upon the

Check your DIAL INDICATORS



MODEL CS-75
Folder Upon Request.

THE DIAL INDICATOR CALIBRATOR is used to check and calibrate the accuracy of dial indicators and production checking of pieces having a number of different diameters. The range is 0 to 1/4" travel of CW or CCW indicators. Direct reading is to .000025". Standard unit set for AGD stem on indicators. (Pat. applied for).

CUSTOM SCIENTIFIC INSTRUMENTS, Inc.
541 DEVON ST. KEARNY, N. J.

For more data circle 581 on Reader Service Card

modern machine shop 285

announced its fully automatic high speed Auto-Tap—a self-contained tapping head unit that operates from a

THE Original METCALF

BARRE-GRANITE SURFACE PLATES



The truest working surface of all, made of genuine fine-grained Barre Granite.

- won't warp
- corrosion proof
- non-magnetic
- non-abrasive
- temperature resistant
- sizes 9" x 12" to 60" x 120"
- accuracy guaranteed .00005 on sizes up to 24" x 36"

Write for circular and prices.
Some dealer territories open.

**HERCULES PRECISION GRANITE
SURFACE PLATE COMPANY**

33 Second Ave.

New York 3, N. Y.

For more data circle 582 on Reader Service Card

Spin your **RIVETS** faster and more economically on the **NOISELESS LINLEY RIVETER**



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to 3/8" and larger size rivets in softer materials.

Send for Bulletin R today.

LINLEY BROTHERS CO.

Also builders of JIG BORERS

571 State St., Ext., Bridgeport 1, Conn.

For more data circle 583 on Reader Service Card

286 modern machine shop

new shop equipment . . .



View of Triple-E Spray-Cooler Cooling System

type of metalworking job) by adjusting two valves. With the atomized spray emerging from the nozzle, 1 1/4 gallons of coolant will last for approximately 16 hours under normal operating conditions.

The Spray-Cooler can be used on any metalworking machine. It is especially suited to machines which are not in regular use, because of the cooling unit's low cost, portability and simplicity of installation. It has been found to be particularly adaptable to punch presses.

Of stainless steel construction throughout, the Spray-Cooler is claimed to be highly resistant to corrosion. It eliminates some of the objections to conventional flood cooling — the mess and the hot weather rancidity.

For more data circle 138 on Reader Service Card

★ ★ ★

LEAD SCREW TAPPING HEAD

Automatic Methods, Inc., 829 West Grand St., Elizabeth, N. J., recently

August, 1957

announced its fully automatic high speed Auto-Tap—a self-contained tapping head unit that operates from a drill press or a direct motor hookup. Born from the need of faster precision tapping by unskilled labor, the Auto-Tap, with its three way control box, actually automates tapping economically even for the small shop. The three way control box permits fingertip, foot switch or remote control set-up for the fully automatic production line. The Auto-Tap has an adjustable depth control and reversing mechanism that is activated by a relay. The built-in activating air motor requires low pressure air and is responsible for the unusual sensitivity of the unit that is said to assure repetitive accuracy and precision, avoiding tap breakage, reducing work spoilage and reducing operator fatigue.

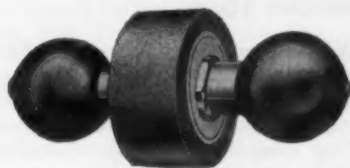
Featured is a clutch of high temperature material which, under normal operation, never has to be replaced. The Auto-Tap operates on an 8 volt transformer connected to a 110 volt outlet. The tap range is from 0-80 to $\frac{3}{4}$ -10, up to a 2 inch stroke. For more data circle 139 on Reader Service Card



Auto-Tap Automatic Lead Screw Tapping Head

August, 1957

THE Original METCALF GRINDING WHEEL DRESSER



**BALANCED
FAST—COOL CUTTING ACTION—
HIGH SPEED WHEEL FORMING
and CRUSHING**

COMPLETE ASSEMBLY\$7.95
EXTRA WHEEL\$1.50

Made by the World's Largest Manufacturers of
SAW SHARPENING and KNIFE GRINDING
MACHINERY

HANCHETT MANUFACTURING COMPANY

Main Office West Coast
Big Rapids, Michigan Portland, Oregon

For more data circle 584 on Reader Service Card

Wgt. 650 lbs.

**PRICE
\$695.00**

**Cast
Pedestal
Base
\$95.00
 $\frac{3}{4}$ H.P.**



BARKER Model A-M Milling Machine

A heavier Barker Mill with larger working surfaces for machining bigger parts. Takes # 30MM standard adapters. Will accommodate most standard indexing heads, vises and special accessories.

Write for Literature

BARKER ENGINEERING CO.
500 Green Rd. Cleveland 21, Ohio

For more data circle 585 on Reader Service Card

modern machine shop 287

**GAGE CHECKS EXTREMELY
DELICATE PARTS**

by being alternately heated and cooled. To begin the gaging cycle, a work-

new shop equipment . . .

SCRIBING TOOL

With the introduction of its Slim-Line Micro-Scriber, The Greist Manufacturing Co., 495 Blake St., New Haven 15, Conn., now offers a choice of two models—one of these scribing tools is for fine heavy duty use and the other is for finer, detail work.

The Slim-Line can be utilized for close and fine scribing on all metals including case hardened steel, aluminum, bronze, brass, copper, monel and titanium, as well as precious gems, plastics, ceramics, glass and so on. Shaped like a pencil, it was designed for expediting die layout, scoring, engraving and marking in machine tool repair shops, industrial plants, maintenance departments and so on. Its tip, which is an alloy consisting of

95 per cent tungsten carbide and 5 per cent cobalt, has been diamond ground and precision lapped. This tip is secured within the anodized aluminum body of the scriber, which is hexagonal in shape, to eliminate rolling. Each Slim-Line is factory sealed within a clear plastic bubble and is securely attached to a multi-colored display card.

For more data circle 140 on Reader Service Card



TAP SHARPENER

MODEL 50

for 2, 3, 4 flute taps
collet capacity
to 1-1/16"

MODEL 60

for 4, 5, 6 flute taps
collet capacity
to 2-1/4"

- low cost
- quick
- accurate
- push button controls
- no cams required

Write for demonstration and literature



ROCKFORD DIE & TOOL WORKS, INC.

1816 Seventeenth Ave.

Rockford, Ill.

For more data circle 586 on Reader Service Card



Greist Micro-Scriber

GAGE CHECKS EXTREMELY DELICATE PARTS WITHOUT DAMAGE

Extremely delicate parts such as light springs, bellows, diaphragms, vacuum tube grids and so on can now be measured without fear of distorting them by means of a pressureless comparator, manufactured by Federal Products Corp., 7146 Eddy St., Providence 1, Rhode Island.

This Air-Electronic Gage is called pressureless because the sensitive gaging contact exerts practically no pressure on the workpiece that is being checked.

The extremely low gaging pressure is obtained through an arrangement in which the sensitive gaging contact is raised and lowered by a special type of wire. The wire has rapid response to heat and is made to fluctuate in length

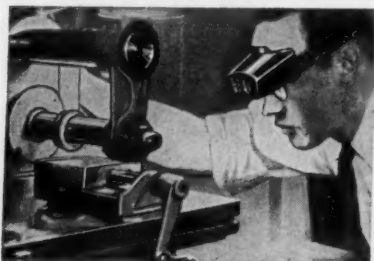
by being alternately heated and cooled.

To begin the gaging cycle, a workpiece is placed in position and the gage switch turned to "gage." This applies heat to the wire. As the wire heats, it lengthens and the sensitive gaging contact moves toward the workpiece. As soon as the contact touches the work, it establishes a circuit which removes the voltage across the wire, allowing it to cool so that it contracts. This raises the gaging contact from the workpiece, breaking the arresting circuit so that the wire begins heating again. Once more the gaging member is lowered until contact is established with the work. This action takes place so rapidly that it gives the impression that the contact is hovering over the workpiece.

The gaging mechanism consists of a gage head connected by a frictionless motion transfer unit to the sensi-

★ ★ ★ ★ ★

People work better when they SEE BETTER®



In Bell Telephone Laboratories:
*Precision machinist working on a mill-
ing machine finds Magni-Focuser an
invaluable seeing aid.*

MAGNI-FOCUSER'S
matched prismatic lenses give needle-sharp mag-
nification. Comfortably light weight. Fits over
regular glasses. Leaves both hands free. Normal
vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

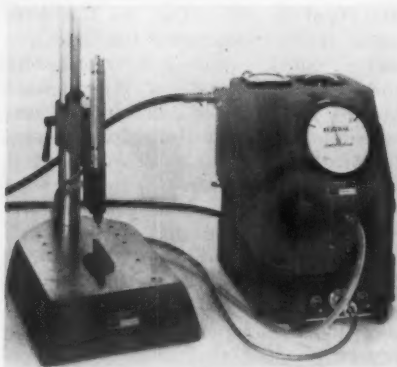
Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO. 480 Lexington Ave.,
Dept. P, New York 17, N. Y.

For more data circle 587 on Reader Service Card

new shop equipment . . .



Federal Air-Electronic Measuring Gage

tive contact and by a plastic hose to a Dimensionair Air Gage. The movement of the sensitive contact causes a

target face in the gage head to move against an air jet so that the movement can be seen on the Dimensionair Dial.

For more data circle 141 on Reader Service Card

★ ★ ★

ADJUSTABLE BED PRESS IS REDESIGNED

Niagara Machine and Tool Works, Buffalo 11, N. Y., has announced that it has modernized and redesigned its line of adjustable bed presses. The trim, compact design incorporates specialized controls and devices, neatly recessed in the sidewalls or completely housed behind flush panel doors. Specially equipped for secondary operations between automated presses in the production line, this press is said to achieve fast, safe and efficient output.

There are no overhanging or protruding components. The operator's

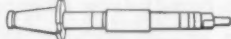
MANHATTAN'S MIRACLES! Top Values . . . Lowest Prices

MILLING MACHINE ARBORS

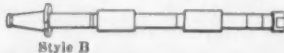
30-40-50 Tapers

Threads for Drawbar:

#30 Tapers — 1/2"-13
#40 Tapers — 3/4"-11
#50 Tapers — 1"-8



Style A (has pilot 23-32" dia.)



Style B

- All parts hardened, ground and lapped.
- Ground threads on arbors and nuts.
- Complete with assorted width arbor spacers and running bushings as shown.
- For milling machines with #30, 40 & 50 National Standard Taper Spindles.
- Finest German Quality.

For tremendous savings,
write for free circular

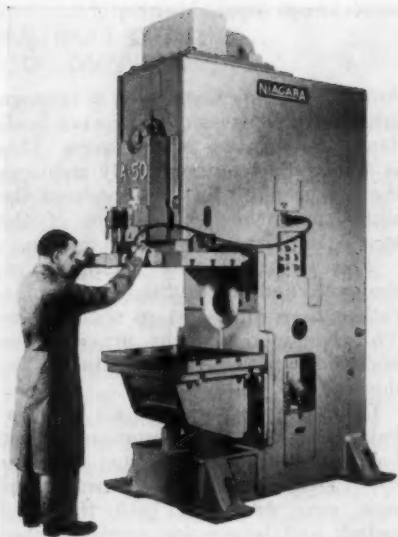
MANHATTAN SUPPLY COMPANY

The Cutting Tool Discount House
151-A Grand St., New York 13, N. Y.
Telephone: CAnal 6-4992

Arbor No.	Taper	Diam. of Arbor	Length of Shoulder to Nut	Diam. of Running Bushing	Running Price	Net Price Each
30% A 10-2*	30	7/8"	10"	1 1/4"	1	\$49.70
31 A 10-2*	30	1"	10"	1 1/4"	1	53.82
31 1/4 A 10-2*	30	1 1/4"	10"	1 1/4"	1	58.00
40% A 10*	40	7/8"	10"	1 1/2"	1	47.70
40% A 16-3*	40	7/8"	16"	1 1/2"	1	62.10
41 A 12*	40	1"	12"	1 1/2"	1	55.90
41 A 16-3*	40	1"	16"	1 1/2"	1	66.25
41 1/4 A 12	40	1 1/4"	12"	1 1/2"	1	62.10
41 1/4 A 16-3*	40	1 1/4"	16"	1 1/2"	1	72.45
40% B 14-3	40	7/8"	14"	1 1/2"	1	58.00
41 B 14-3	40	1"	14"	1 1/2"	1	62.10
41 1/4 B 14-3	40	1 1/4"	14"	1 1/2"	1	66.25
41 B 20-3	40	1"	20"	1 1/2"	1	76.90
41 1/4 B 20-3	40	1 1/4"	20"	1 1/2"	1	78.70
41 1/2 B 20-4	40	1 1/2"	20"	2 1/4"	1	82.80
50% A 10*	50	7/8"	10"	1 1/2"	1	55.90
50% A 18-4*	50	7/8"	18"	2 1/4"	1	72.45
51 A 12	50	1"	12"	1 1/2"	1	60.00
51 A 18-4*	50	1"	18"	2 1/4"	1	76.90
51 1/4 A 12*	50	1 1/4"	12"	1 1/2"	1	64.20
51 1/4 A 18-4*	50	1 1/4"	18"	2 1/4"	1	80.75
51 B 15-4	50	1"	15"	2 1/4"	1	68.30
51 B 18-4	50	1"	18"	2 1/4"	2	76.90
51 B 24-4	50	1"	24"	2 1/4"	2	86.95
51 1/4 B 15-4	50	1 1/4"	15"	2 1/4"	1	72.45
51 1/4 B 18-4	50	1 1/4"	18"	2 1/4"	2	80.75
51 1/4 B 24-4	50	1 1/4"	24"	2 1/4"	2	91.10
51 1/4 B 24-5	50	1 1/4"	24"	2 1/4"	2	91.10
51 1/4 B 30-4	50	1 1/4"	30"	2 1/4"	2	111.80
51 1/2 B 18-4	50	1 1/2"	18"	2 1/4"	2	86.95
51 1/2 B 24-4	50	1 1/2"	24"	2 1/4"	2	103.50
51 1/2 B 24-5	50	1 1/2"	24"	2 1/4"	2	103.50
51 1/2 B 30-5	50	1 1/2"	30"	2 1/4"	2	128.35
51 1/2 B 36-5	50	1 1/2"	36"	2 1/4"	2	147.00
52 B 24-5	50	2"	24"	2 1/4"	2	128.35
52 B 36-5	50	2"	36"	2 1/4"	2	175.95

*Style A; all others Style B

For more data circle 588 on Reader Service Card



Niagara Redesign Adjustable Bed Press

panel, auxiliary power supply, fly-wheel brake operating lever and safety block are recessed into the right side of the press. On the opposite side, a panel door flush with the surface conceals the automatic oil circulating system. Neatly housed and enclosed in the back of the press are the air control panel and combination motor-press control panel.

Niagara Adjustable Bed Presses are designed for easy portability in connection with or beyond the production line. They can be hoisted or readily moved on their skid type feet.

For more data circle 142 on Reader Service Card

★ ★ ★

FORGING PRESSES ARE REDESIGNED

E. W. Bliss Co., Canton, Ohio, has announced the recent redesign of its line of high speed forging presses.

The STEVENS Line SINCE 1925

Introducing NEW series



15" ROTARY
TABLE—STD.

ROTARY TABLES, 5-7½-8-12-15-18-24" sizes both standard and dial indexing types

ADJUSTABLE TILTING TABLES, #0-1-2

COMPOUND TABLES, #1-2

ROTARY-COMPOUND TABLES, #1-1½-2

INDEX CENTERS—multiple spindle

SPECIAL MACHINES—designed and built

See your dealer or write for bulletins

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

For more data circle 589 on Reader Service Card
August, 1957

6" Universal Dividing Head



Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Catalog

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. • Cincinnati, Ohio

For more data circle 590 on Reader Service Card
modern machine shop 291

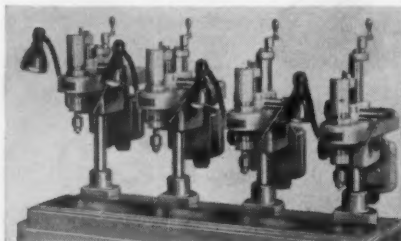
EXIT SHADOWS

... enter stepped-up
production with

VIMCO *Lights*

Efficient plant production requires more direct light on individual machines that even modern plant lighting can provide.

VIMCOLights adjust as quickly as a hand can turn. They direct light exactly where it's needed. No bolts, no screws. Coil-and-swivel combinations make adjustability instant.



Vimcolights in use on four Maxi-Jr. Drilling Machines on common base.

Machine users send for Bulletin 85

Machine manufacturers send for
"DEM" Bulletin

VIMCO MFG. CO., Inc.

Since 1919

111 Brayton Street, Buffalo, N. Y.

For more data circle 591 on Reader Service Card

292 modern machine shop

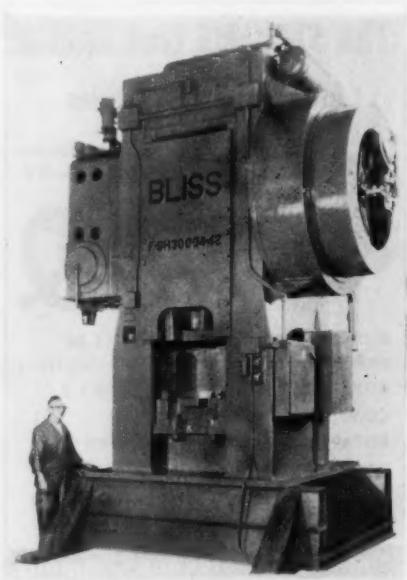
new shop equipment . . .

Among the new features is a tonnage limiter which is said to prevent accidental overloading of the press. This is achieved by automatically reducing the air pressure on the clutch as the slide approaches the bottom of the stroke, and increasing it on return.

The brake, likewise, has been redesigned and now utilizes a double, rather than single, clam shell brake. This has increased the braking area and, along with a larger cylinder, has doubled the braking effect.

Other features include air counter-balances instead of previously used buffers; air actuated wedge type die seat; redesigned flywheel brake and new gear drive for both the limit switch and lubrication pump, replacing the earlier sprocket drive.

For more data circle 143 on Reader Service Card



Bliss Redesigned High Speed Forging Press

August, 1957

OSCILLATING LAPPING MACHINE MULTIPLES CUTTING TOOL OUTPUT

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill., is marketing a Hyprez Machine for the lapping and refinishing of carbide or ceramic cutting tools. An important feature of this machine is that the Meehanite lapping wheels oscillate as they rotate—with a controlled variation of stroke from 0 to 1 inch. Thus, the rotating wheel moves across the edge of the tool or insert while it is held firmly in a precise position, thereby reducing the possibility of error. Protractors for the horizontal and vertical planes assure exact angles and straight edges. Without disturbing the geometry of the tool, the top, lands and radii can be finished to one micro inch in two minutes or less.

For more data circle 144 on Reader Service Card



Hyprez Oscillating Lapping Machine in use

August, 1957

the scale you can count on!

**every shop needs one
for counting small
parts, estimating, or
check
weighing**



AVAILABLE IN ALL WEIGHING STANDARDS

for further information write:

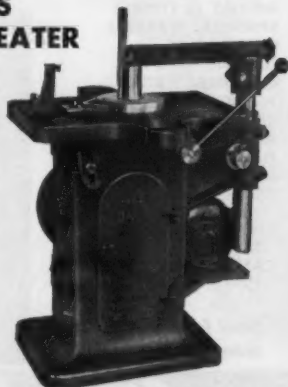
OHAUS
SCALE CORPORATION
1050 COMMERCIAL AVE.
UNION, NEW JERSEY

For more data circle 592 on Reader Service Card

Why Use A Shaper to cut Keyways when a DAVIS KEYSEATER

will
do the
job so
much
quicker
and
better?

Send
for
Circular



DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.
ROCHESTER, N. Y.

For more data circle 593 on Reader Service Card

modern machine shop 293

new shop equipment . . .

GEAR GAGING, SORTING AND MACHINE TOOL CONTROL UNIT

The Model GRF Red Ring Pedestal Type Gear Gaging, Sorting and Machine Tool Control Unit for gear production lines is now available from National Broach and Machine Co., 5600 St. Jean, Detroit 13, Mich. The

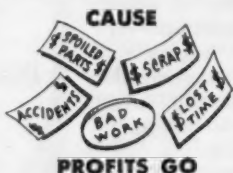
unit can be adapted to check size and helix angle accuracy of spur or helical gears. A model for hobbing machines checks and sorts gears for both size and helix angle accuracy. Another model for gear shapers and shaving machines checks and sorts gears for size accuracy only.

The gaging machine, shown in the accompanying illustration, is a standardized Red Ring design which consists of a motorized gaging and sorting unit through which the gears are fed

★ ★ ★ ★ ★



MAKESHIFT SETUPS

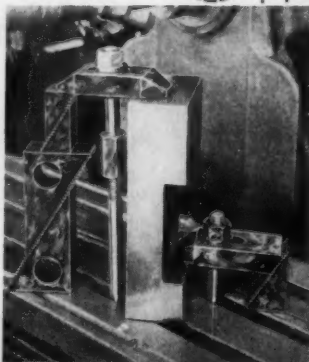


T-NUT & STUD SETS—
12 SIZES
STEP BLOCK & CLAMP
SETS—7 SIZES

QUARTER TURN SCREWS
SHOULDER SCREWS
JIG FEET (3 TYPES)
SPHERICAL WASHERS
LATCH BOLTS
FLANGED NUTS
CUT THREAD STUDS
TEE NUTS
COUPLING NUTS
ADJUSTABLE STEP BLOCKS
FIXTURE KEYS
KNURLED HEAD SCREWS
TOGGLE SHOE CLAMPS &
V-PADS
STRAP CLAMPS (PLAIN &
STEP TYPE)
CAST IRON & ALUMINUM
HAND KNOBS

Send for free tracing
template and catalog

BE WISE
Save with
NORTHWESTERN



NORTHWESTERN dealers stock in:

Phoenix, Arizona
Tucson, Arizona
Glendale, California
Oakland, California
San Diego, California
Brantford, Ontario, Canada
Montreal, Quebec, Canada
Denver, Colorado
Stratford, Connecticut
Wilmington, Delaware
Chicago, Illinois
Rockford, Illinois
Indianapolis, Indiana
Richmond, Indiana
South Bend, Indiana
Cedar Rapids, Iowa
Wichita, Kansas
New Orleans, Louisiana
Baltimore, Maryland
Hyde Park, Massachusetts
Detroit, Michigan
Grand Rapids, Michigan
Minneapolis, Minnesota
Kansas City, Missouri
Bloomfield, New Jersey
Brooklyn, New York
Buffalo, New York
Elmira, New York
Jamestown, New York
Mineola, New York
New York, New York
Poughkeepsie, New York
Monroe, North Carolina
Cincinnati, Ohio
Cleveland, Ohio
Dayton, Ohio
Toledo, Ohio
Oklahoma City, Oklahoma
Tulsa, Oklahoma
East McKeesport, Pennsylvania
Erie, Pennsylvania
Philadelphia, Pennsylvania
Nashville, Tennessee
Dallas, Texas
Houston, Texas
Salt Lake City, Utah
Milwaukee, Wisconsin

Northwestern

119 HOLLIER AVE., DAYTON 3, OHIO



For more data circle 594 on Reader Service Card

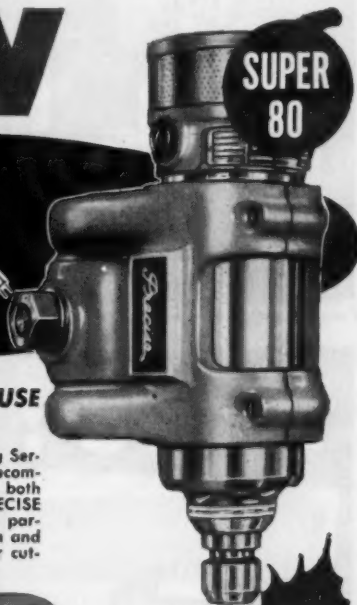
one at a time from an inclined feed chute. Gears that pass inspection travel through the machine into an inclined exit feed chute. The machine is supported by a cast iron pedestal base and a tubular steel column that is designed to occupy a minimum of floor space. Vertical height adjustment is provided by a threaded spanner nut arrangement on the column support. The gaging unit has a motorized

lower master gear and a non-rotating upper master gear, through which the production gears are passed for the gaging check. The upper master gear is pivoted in two planes, to assure accurate size check without helix angle interference. Another feature of the gaging unit is the ability to rotate the upper master gear from one fixed position to another, thus permitting adjustment for wear without replacing

★ ★ ★ ★ ★

NEW

Precise
POWER QUILL®



HIGH-CYCLE PERFORMANCE WITHOUT USE OF COSTLY HIGH-CYCLE EQUIPMENT

Continuously Variable Speed Range Through Electric Control with Simple Dial Calibration — 7000 to 25,000 RPM.

Largest and Most Powerful Available.

Super Accurate Collet Chuck with 1/2" Capacity to Insure Maximum Rigidity for modern precision demands. (Available also with solid quill extension for mounting wheels to 1/2" I.D. and 2 1/2" O.D.)

Unlimited adaptability to single or multiple grinding-milling operations . . . Tolerances of .0001".

Operates from standard 115V power supply.

Our Complete Engineering Service is available for recommendations and advice both on the application of PRECISE POWER QUILLS to your particular production problem and for the use of the proper cutting tool on your job.



FULL
1 1/2
H.P.
AT THE
QUILL



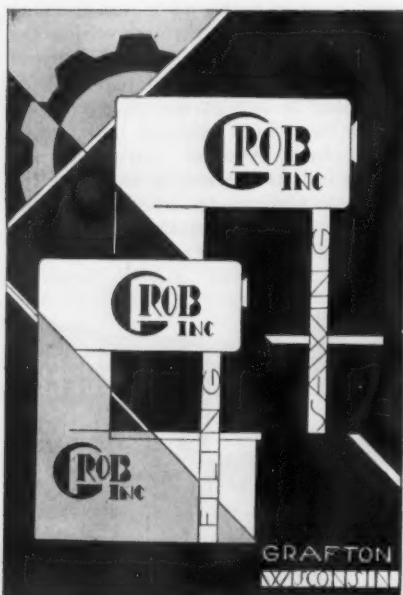
PRECISE PRODUCTS CORP.

3745 Blue River Road, Racine, Wisconsin

For more data circle 595 on Reader Service Card

August, 1957

modern machine shop 295



For more data circle 596 on Reader Service Card

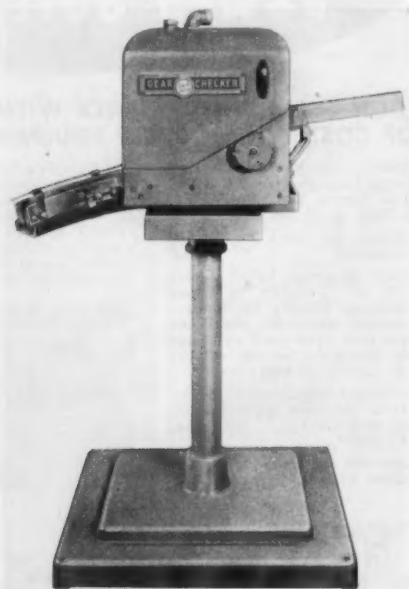


For more data circle 597 on Reader Service Card

new shop equipment . . .

the gear. The use of a non-rotating upper master gear is also said to eliminate gaging problems that could result from spacing or runout errors. An anti-jamming slip clutch in the drive mechanism for the lower rotating master gear automatically remeshes any gear that does not initially engage the master gears correctly.

Separate electrical controls for the unit can be mounted at any desired location. Reject pans for gears that do not pass size or helix angle specifications are under the gaging machine. The unit automatically shuts down the gear production machine whose output it is gaging after a predetermined number of reject parts are detected. It can also be used as a feedback control unit to automatically



Red Ring Model GRF Pedestal Type Gear Gaging, Sorting and Machine Tool Control Unit

shift hobs on hobbing machines when measurements indicate dulling of the tool.

For more data circle 145 on Reader Service Card

★ ★ ★

SIX SPINDLE TURRET DRILLING MACHINE HAS 7 INCH STROKE

Burg Tool Manufacturing Co., Inc., 15001 South Figueroa St., Gardena, Calif., is marketing its Burgmaster Model 1C Power Indexing, Six Spindle Turret Drill. This drill has a 1/2 inch capacity in cast iron. The machine has been designed to fill the need for a small, fast unit. It has a 7 inch stroke and a speed range of from 325 to 4,050 r.p.m.

The Model 1C features preselective speeds and stops, quick change tools and the ability to do any combination of six operations in one setup.

For more data circle 146 on Reader Service Card



Burgmaster Model 1C Turret Drill in use

August, 1957

*** W.H.O.'s
ALWAYS
FIRSTTEST**



**CAP SCREWS • COUPLING BOLTS
SET SCREWS • MILLED STUDS**

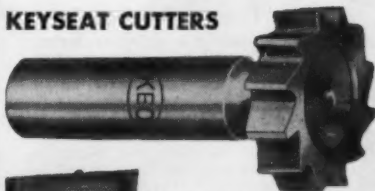
... our specialty

*** Wm. H. Ottemiller co.**
YORK, PENNA.

For more data circle 598 on Reader Service Card

KEO

KEYSEAT CUTTERS



High speed. Right hand 1/2" shank. Diameter from 1/4" to 1 1/2". Standard sizes in stock for immediate delivery. Complete set — 41 sizes — available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

WRITE, WIRE OR PHONE
Jobbers' Inquiries Invited

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

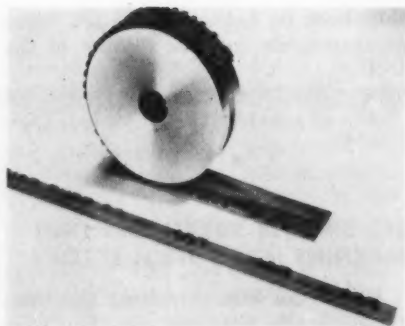
For more data circle 599 on Reader Service Card

modern machine shop 297

new shop equipment . . .

ALUMINUM PRINTING WHEEL

The Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pa., recently announced its Aluminum E-Z Set Printing Wheels. Rubber dies are pressed into place quickly and surely without time consuming bolts, thumb screws or tools. There is nothing to loosen or wear. Simply press the die's E-Z Set base, either individual letters or logotypes, into the wheel's E-Z Set groove. It stays positioned for even high speed printing and clear, clean impressions are said to be assured. The printing message is stripped off the wheel as quickly as it is slipped on. The Aluminum E-Z Set Printing Wheel handles type characters and logos from 1/16 inch to 3 inches and different sizes can be used on the same wheel. Four, six and eight inch wheels are



Pannier Aluminum E-Z Set Printing Wheel

available. This printing wheel is suited for continuous printing operations that require numerous and fast type changes. These wheels can be used with all of the company's hand and automatic printers. The wheel is aluminum and is keyed onto shaft.

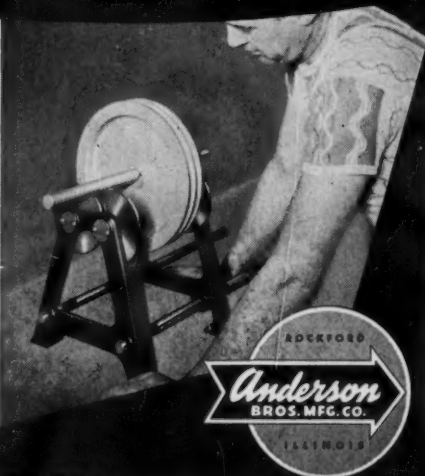
For more data circle 147 on Reader Service Card

PRECISION BALANCING WAYS

Save Time . . . Cut Cost

Balance rotating parts easier, faster, more accurately with supersensitive Anderson Balancing Ways. No setup, no leveling, no centering. Chilled iron discs, ground and balanced to extreme accuracy, rotate with minimum friction on special bearings. Glass-hard spindles and bearings prevent wear or ball-bearing indentations when balancing heavy weights. Superior accuracy lasts throughout long life. Proved and preferred over 40 years. Write for bulletin 8-22.

Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS

GERMICIDE FOR WATER BASED COOLANTS

F. E. Anderson Oil Co., Inc., Box 216, Portland, Conn., has introduced a germicide, Winsor G-6, which is claimed to be truly effective for water based coolants. Winsor G-6 Germicide accomplishes positive kill of bacteria and eliminates unpleasant coolant odors. Intensive experimental research in the company's laboratories, and in the field, have confirmed the increased effectiveness of this new germicide.

For more data circle 148 on Reader Service Card

★ ★ ★

MAGNETIC CHIP REMOVER

An improved development of removing chips from blind holes by use of a magnet has been introduced by Heimann Manufacturing Co., Urbana, Ohio. The product features a permanent magnet that will give years of



Heimann Magnetic Chip Remover in use

use. It supplants makeshifts that lose strength quickly and have to be remagnetized. It is claimed to be safer than air blast removal, which scatters chips in unwanted places.

The Heimann Magnetic Chip Remover consists of a permanent magnet securely fitted into a knurled aluminum holder and is made in various sizes upward from 1/8 inch in diame-

Commander TAPPER

- Wider Range . . . 1 Tapper Handles No. 0 to 3/4" Taps
- Automatic Tap Protection
- Furnished to fit any Drill Press

Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog.

COMMANDER MFG. CO.

4224 W. Kinzie St.

Chicago 24, Ill.



Any operator
does precision
tapping with
a *Commander*
TAPPER

Product of *Commander* . . . Builder of the *Multi-Drill*

For more data circle 601 on Reader Service Card

new shop equipment . . .

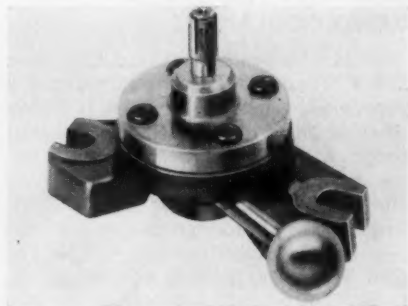
ter. It is said to make considerable savings in mechanic's time and, also, to increase the usable hours of high investment machines, such as jig borers and so on.

For more data circle 149 on Reader Service Card

★ ★ ★

HOLDING FIXTURE COMBINES ARBOR WITH FLANGED ADAPTER

Another combination of its Tork-lok Arbor (drawbar model) has been announced by the N. A. Woodworth Co., 1300 East Nine Mile Rd., Detroit 20, Mich. Known as the Tork-lok Fixture, this unit combines the arbor with a flanged adapter into which is incorporated the actuating mechanism for the arbor. Seven sizes of fixtures are available to cover the range from 1/2 inch to 2-9/16 inches.



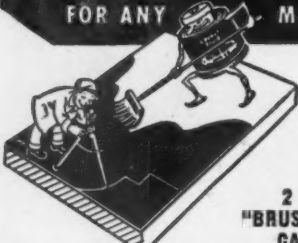
View of Woodworth Tork-lok Holding Fixture

A multitude of operations, including drilling, reaming, tapping, milling, surface grinding, gear shaping, gear hobbing and burring, can be performed with the aid of this holding device. This fixture is claimed to have many possibilities in automation type units and in built-up gaging units.

For more data circle 150 on Reader Service Card

LAYOUT FLUID

FOR ANY METAL



**TRIAL
OFFER**

**2 FOUR OZ.
"BRUSH-IN-CAP"
CANS: \$1.00**

Send me my order of D-R LAYOUT FLUID right away!

Bill me ☐ Bill my company ☐

Name

Company Name

Address

City Zone State

DAYTON ROGERS
Manufacturing Company

Minneapolis 70, Minnesota

For more data circle 602 on Reader Service Card

300 modern machine shop

TROYKE

WORM WHEEL OPERATED ROTARY TABLES

Precision ground tables at the lowest prices.



A size and type to meet your requirement.

★

For complete information and prices write for Free Catalog No. 22.

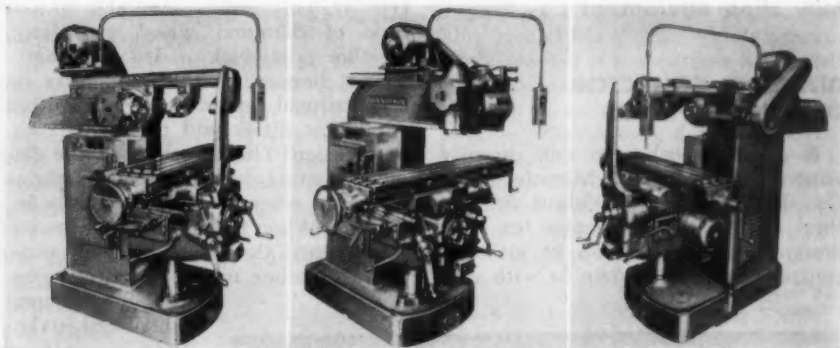


TROYKE MFG. CO.

11296 Orchard Street
Cincinnati 41 (Sharonville), Ohio

For more data circle 603 on Reader Service Card

August, 1957



(Left to right) Van Norman Model 24MA, 24LA and 24MLA Ram Type Milling Machines

RAM TYPE MILLING MACHINES

Three new ram type milling machines, known as the Models 24LA, 24MA and 24MLA, have been added to its line by Van Norman Machine Co., Springfield 7, Mass. All of these

machines feature an adjustable cutter-head on which, with just one milling machine, it is possible to do horizontal, vertical and angular milling. According to the manufacturer, this reduces purchase and milling costs to a very great extent.

For more data circle 151 on Reader Service Card

NIBBLE *Your* **COSTS**

WITH... **SAVAGE NIBBLING MACHINES**

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or TEMPLATE CUTTING
- SPEED WITH ACCURACY
NO SECONDARY OPERATIONS
- SPEED WITH SAFETY
NO OPEN FLAME OR SPARKS



Up to $\frac{3}{4}$ " Capacity
in MILD STEEL

QUOTATION ON REQUEST

W.J. SAVAGE COMPANY

KNOXVILLE TENNESSEE

NIBBLING MACHINE PIONEERS

For more data circle 604 on Reader Service Card

August, 1957

**NO REVERSE LEVER!
WON'T STICK!
.075 TRAVEL!
RUGGED!**



PEARSON DIAL INDICATOR

wears IN,
instead of wearing out!

A highly sensitive, easy-to-read finger-type indicator that will read either direction *without* reverse lever or clumsy gear shifting. Will accurately repeat within .0001. The extra long contact point makes it more accessible and versatile. Unconditional lifetime guarantee. WRITE TODAY FOR COMPLETE DETAILS.

WRITE TODAY!

M & G INSTRUMENT CO.

Dept. 30, 12940 Satcoy Street,
North Hollywood, California
DEALER INQUIRIES INVITED

For more data circle 605 on Reader Service Card

modern machine shop 301

new shop equipment . . .**DIAMOND COLLECTOR
ELIMINATES FILTERS**

A diamond collector was recently announced by Torit Manufacturing Co., Dept. 703, 296 Walnut St., St. Paul 2, Minn. The collector has been designed for installation in either a central collecting system or with unit

type systems and is adaptable to any type of diamond wheel grinding, whether mist, wick or dry grinding.

The diamond collector operates on a centrifugal separating principle that eliminates filters and permits a compact design. The unit deposits the diamond bearing dust in a clear Plexiglas container where it can be visually inspected. When full, the top can be unscrewed and the container easily emptied. No other maintenance is neces-

sary. The efficient centrifugal principle is claimed to eliminate filters, oil baths and inflammable types of materials.

Its compact design (the collector plus the power unit weigh only 65 pounds) allows it to be mounted directly on machinery, walls, overhead beams or on a specially designed table available with the collector. When mounted on

ARROW TOOL & REAMER CO. • Established 1916



Arrow
means a complete
LINE OF END MILLS

Manufacturing skill
and tool making ex-
perience for over 37
years — adds up to
preference for Arrow
End Mills.

THIS IS
Arrow's
3
FLUTE
END MILL

ARROW TOOL & REAMER CO.
711 Stephenson Highway
P. O. Box 338 • Troy, Michigan

For more data circle 606 on Reader Service Card



Diamond Collector

For more data circle 604 on Reader Service Card

For more data circle 605 on Reader Service Card

August, 1957

modern machine shop 301

the table, it occupies only 14 by 22 inches of floor space.

Because it is impractical to reclaim diamond dust that has been contaminated with residue from other type grinding wheels, this unit is equipped with a by-pass valve. This allows grinding wheels of other types to be intermittently used on the same grinder without danger of contaminating the collected diamond dust. The diamond collector is powered by a $\frac{1}{2}$ h.p., 3,450 r.p.m. motor, either 110 volt, 60 cycle, single phase, or 220 to 440 volt, 60 cycle, three phase and is available with various other electrical characteristics.

For more data circle 152 on Reader Service Card

★ ★ ★

HIGH PRECISION CHUCK

Alina Corp., 122 East Second St., Mineola, L. I., N. Y., recently introduced its Scroll Chuck, which is a high precision chuck developed to meet exacting requirements. The



Alina Scroll Chuck

August, 1957

method of clamping the largest possible area of the circumference permits minimum use of pressure; it is claimed that fragile work is never deformed or crushed. In order to maintain this advantage, chucks over 4 inch capacity are equipped with eight jaws.

Removable jaws are available in a wide variety of styles for internal or external chucking, or may be obtained in blank form for machining.

ELEVATING WORK TABLE

for FAST, SAFE, handling of dies



A strong, husky, die table with big overload safety factor

2000 lb. capacity

NOW
\$245⁰⁰

f.o.b. Chicago

This "one man" die handler belongs in every machine shop

GREATER LIFTING RANGE

Sturdy, reinforced 24" x 36" table top elevates from 24" min. to 42" max. above floor.

Roller bearings in wheels and casters for easy moving. Floor lock included.

High and low speed crank studs at each end of table.

Order Today — Free Trial

Specify 10 day free trial with full credit return privilege.

ECONOMY
ENGINEERING

4507 W. Lake St., Chicago 24, Ill.

For more data circle 607 on Reader Service Card

modern machine shop 303

new shop equipment . . .

Simple design permits quick and easy replacement of the shank, and shanks to suit special requirements may be machined at minimum cost in any shop. This chuck comes in six sizes, from 2 to 6 inches, to fill all machines. It comes with or without shanks.

For more data circle 153 on Reader Service Card

LIGHTWEIGHT POWDER BLOWER SPEEDS MAGNETIC PARTICLE TESTING

A completely self-contained, portable unit is now available from Magnaflux Corp., 7323 West Ainslie Ave., Chicago 31, Ill., for the proper application of dry Magnaflux Powder. The No. 58600 Powder Blower operates directly from any air line and requires

only 20 p.s.i. A simple adjustment controls the density of the cloud of powder, and two pushbuttons permit selection of either powder or clean air. By holding the gun level and at a distance from the area being tested, the particles gently flood the entire area, showing clear indications of cracks.

This blower is compact and weighs 2¼ pounds empty. It is simple to operate, is fast, covers a wide area and distributes the magnetic particles evenly.

For more data circle 154 on Reader Service Card



View of Magnaflux Powder Blower

GAGING PROBLEM IN MIND?



Investigate Comtorplug
Unique Expanding
Plug Gage
for Holes
In Volume



COMTORPLUG. Interchangeable expanding plugs gage simple or special bores from 1/8" to 10" diameter.

UNIQUE ADVANTAGES

- Large dial with .0001" graduations.
- Indicates actual size, a fixed — not passing — reading.
- Portable — no wire, hoses, stands or electronic gear.
- Positive 2-point gaging — automatic centering.
- Assured accuracy regardless of who operates it.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Will gage work in the machine.
- A shop tool for all-day every day use.

Anybody can use Comtorplug with positive accuracy . . . at machine, bench, lab . . . anywhere, since it's unencumbered by wires, hose, heavy base or electronic gear. The same amplifier fits all plugs and fixed readings show ACTUAL SIZE, front or back tapes, ovality, etc. Whatever problem bore you have in mind, COMTORPLUG may be the answer.

COMTOR COMPANY
64 Farwell St.
WALTHAM 54
MASS.



GET THE FACTS — REQUEST BULLETIN 50

For more data circle 608 on Reader Service Card

PROCESS AUTOMATICALLY GAGES FULL LENGTH OF HONED BORES

Barnes Drill Co., 860 Chestnut St., Rockford, Ill., has developed an improved method for sizing honed bores as a part of the honing cycle. Referred to as Liquid Sizing, this method automatically gages the diameter of honed bores throughout their full length as honing progresses. Actually sizing is accomplished by metering liquid, directed against the cylinder wall, through orifices in the honing tool until it reaches a preselected pressure point. As honing progresses, the bore increases in size, causing the pressure to decrease. A micro-switch then terminates the honing cycle, permitting the tool to complete the stroke and withdraw from the bore.



METERED
LIQUID
ORIFICES

View showing Barnes-
drill Honing Tool

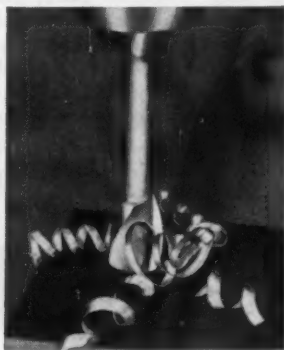
Liquid Sizing offers several advantages. First, the coolant is flooded over the cylinder walls at the most critical point during the honing cycle, thus better heat control is effected. This also provides continuous flushing which materially increases the stone life and provides better micro-finish control.

Furthermore, Barnesdril Plate Type Honing Tools are utilized. These tools are constructed so as to create

YESTERDAY'S PIONEER . . . TODAY'S LEADER

WELDON "TU-LIP" COUNTERBORES

For FAST, FREE
CUTTING



As the name implies, WELDON "Tu-Lip" counterbores have only two cutting lips or flutes. This feature, together with the fast spiral, makes the "Tu-Lip" the fastest, freest cutting counterbore on the market.

Breakage due to clogging is prevented because this improved cutting tool provides more than ample chip room. Furnished singly in sizes desired or in convenient wood block sets as illustrated.

Weldon distributors throughout U.S.A. and Canada
carry complete stocks to serve you.

WRITE FOR LATEST CATALOG NO. 11

THE WELDON TOOL COMPANY



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 609 on Reader Service Card

new shop equipment . . .

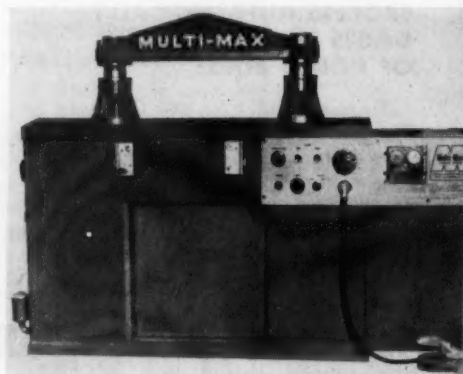
low tool maintenance and increase the ease by which stones are replaced.

For more data circle 155 on Reader Service Card

★ ★ ★

HIGH SPEED PUNCH PRESS

Diamond Machine Tool Corp., Pico, Calif., has announced its completely redesigned Multi-Max Punch Press. It is available in capacities of from 40 to 125 tons; 2 and 4 post models; with speeds of from 40 to 1,000 strokes per minute; bolster and ram areas from 2 by 2 feet to 4 by 12 feet; unlimited shut die height. Material can be fed from front to back, back to front and side to side. Safety features include: two hand control, with locking device on left hand control providing safe one hand operation; hand switch is automatically off when foot

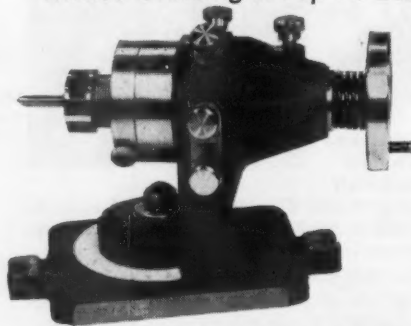


Diamond Redesigned Multi-Max Punch Press

switch is operable; key lock control on control panel; automatic stop on downward stroke of ram, if operator takes hands off controls; in event of power failure, machine automatically "fails safe."

For more data circle 156 on Reader Service Card

Makes Grinding A Tap As Easy As Sharpening A Pencil!



Grinds and Relieves Chamfers of any Tap,
Right or Left, up to 5/8".

- NO COLLETS TO BUY!
- CAN BE USED ON ANY GRINDING MACHINE!
- NO CAMS TO CHANGE!
- PROVIDES UNIFORMITY FOR LONG PRODUCTION RUNS!

The "R & A"
HIGH QUALITY PRECISION
TAP GRINDER

Has all the money-saving features
of higher priced machines!

**LOWEST
PRICE EVER!**

\$195

Write for
Bulletin

#22

R & A MACHINE CO., Inc.

100 GROVE ST.

WORCESTER 5, MASS.

For more data circle 610 on Reader Service Card

MASTER STEP BLOCK

Karl A. Neise, 404 Fourth Ave., Dept. MMS, New York 16, N. Y., has announced the addition of another tool to its MODERN TOOL line; namely, The Mermod Master Step Blocks. These step blocks have been designed to save setup time, increase precision and rigidity of setups and to prevent accidents.

The Mermod Master Step Blocks save the unnecessary hunting time for proper supports which often only result in a setup which is not sufficiently rigid and invites accidents. The quality and accuracy of the work is also jeopardized by such haphazard setups. According to the manufacturer, the Mermod Master Step Blocks do away with these undesirable risks.

Mermod Master Step Blocks are made in Switzerland of case hardened tempered steel. The specially rounded teeth match perfectly; therefore, there



Mermod Master Step Blocks save setup time

is no danger of slippage. Adjustments can be made in steps of approximately 0.04 inch.

Full sets consists of four pieces each of blocks with 5, 9, 12 and 23 teeth. Half sets consist of two each of the same blocks.

All sets are available in widths of 1.77, 2.76 and 3.64 inches, and come in handy aluminum storing trays. Individual pieces are also sold.

For more data circle 157 on Reader Service Card

★ ★ ★ ★

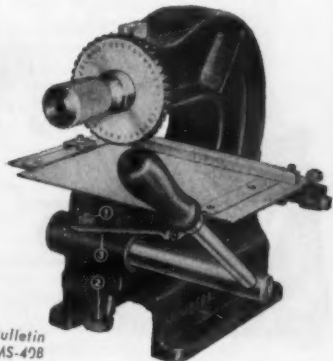


Numbering and Lettering Press Mono Wheel Automatic Spacer

Designed for the purpose of impressing Letters and Numbers in all kinds of Name Plates and Flat Metal Parts. The Dials $3\frac{3}{4}$ " Diameter are made of Special High Grade Tool Steel, scientifically hardened and tempered. The Characters are carefully engraved and make clear cut impressions of uniform depth. Standard Dials are engraved with 40 characters. Character Heights as follows: $1/16$, $3/32$, $1/8$, $5/32$, $3/16$ ". Different size Dials are interchangeable. Carriage Table advances one space with each impression of the Dial, like a typewriter, doing rapid work, even spacing and perfect alignment.

Plates up to 5" wide and 6" long can be stamped, but can furnish a longer Table and Rack if required. Depth of impressions is adjustable by a screw on bottom of machine. A direct sight gauge is provided, to facilitate stamping in the proper place.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.



Bulletin
MS-498
on request.

Model No. 40B

For more data circle 611 on Reader Service Card

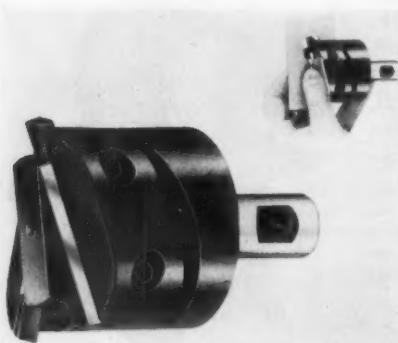
new shop equipment . . .

HEAVY DUTY INSERTED MILLING CUTTER

Portage Double Quick, Inc., 1041 Sweitzer Ave., Akron 11, Ohio, has announced its Manchester Face Mill Cutter which has been designed to handle the tough jobs. Made of S.A.E. 4140 heat treated steel, it is one tool that does not have to be babied. This husky face mill can take a 2½ inch diameter cut. The shear cutting action of the double inserts offer a fast, yet unusually well finished surface. The carbide inserts can be changed in a matter of seconds and easily reset with a tool setting gage.

A tool setting gage is furnished with each cutter. Setting gage eliminates indicating and assures equal tooth load. Settings can be made right at the machine. Carbide inserts offer unusually long service without resharp-ening. When resharping does become necessary, inserts can be sharpened on off-hand grinders, eliminating sharp-ening on tool and cutter grinders. The double vee clamp design makes registering automatic. This tool is available with ¾ or 1 inch diameter shanks.

For more data circle 158 on Reader Service Card



View of P.D.Q. Manchester Face Mill Cutter

308 modern machine shop

HIGH SPEED FLAT TWISTED AND ROLLED SECTION

DRILLS

Unexcelled in Quality
and Performance since 1903!

HI-DUTY Flat-Twisted and Rolled Section Drills are produced by forging and hot twisting bars of high speed steel. This method improves the structure by preserving the grain of the steel. Sizes range from ½" to 3¼" and larger. Milled type drills are also available—from 1/64" to ½" diameter. Hi-Duty means long lasting economical service!

SPECIAL DRILLS

We manufacture a large variety of special types of high speed drills—special diameters and lengths; also step drills.

FAST DELIVERY . . .

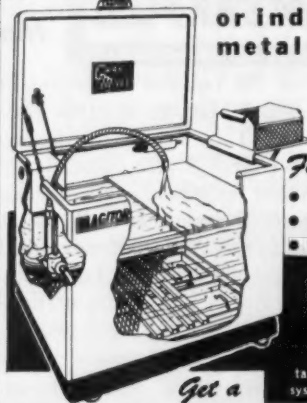
We can make immediate shipment from stock on many special drills! Contact your Industrial Supplier or write today for Catalog and Price List.

HI-DUTY DRILL WORKS

FLEETWOOD, PENNSYLVANIA

For more data circle 612 on Reader Service Card

IF YOU CLEAN DIES or individual metal PARTS



For . . .

- PRODUCTION
- SERVICE
- MAINTENANCE

MODEL
TR 78

Complete with
self-cleaning
filter unit, steel
tank and pumping
system. \$294.00

Get a

GRAYMILLS AGITOR Parts Washer

1. Flush chips and dirt from Metal Parts with filtered solvent.
2. Clean out blind holes and cavities.
3. Do it thoroughly, fast and safely.

Send for catalog and prices.

147

GRAYMILLS CORP.

3769 N. Lincoln Ave.
Chicago 13, Ill.

For more data circle 613 on Reader Service Card

August, 1957

NOW

FUNCTIONAL

new shop equipment . . .

AIR POWER RIVETER IS VERSATILE

Barrett Equipment Co., 21st and Cass Ave., St. Louis 6, Mo., has announced a giant super riveter, which is air powered for speed and operating ease. The 8 inch throat with capacity up to $\frac{3}{8}$ inch tubular rivets, $\frac{3}{16}$ inch solid brass, copper and iron rivets, makes this riveter ideal for servicing automotive, earth-moving and industrial equipment; fabrications of storm sash and shutters; aircraft maintenance and fabrication; and many sheet metal applications, such as punching, slotting and notching operations.

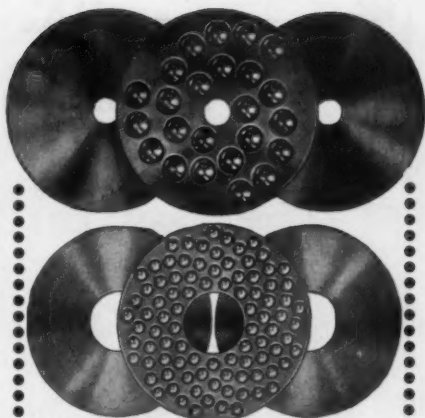
Rugged construction of this riveter is said to insure a lifetime service. An instant change toolholder provides for rapid change of punches, knurls and so on. Available with an adjustable ram stroke and quick release air valve, this riveter may be obtained in bench and deluxe floor models.

For more data circle 159 on Reader Service Card



Barrett Giant Super Air Power Riveter

August, 1957



BALL THRUST BEARINGS

STANDARD SIZES ARE SHOWN IN OUR
GENERAL CATALOG, SENT UPON REQUEST.

Serving Industry for Over 44 Years.

THE GWILLIAM COMPANY

INCORPORATED 1912

358 FURMAN ST. BROOKLYN 1, N. Y.

For more data circle 614 on Reader Service Card

Lewthwaite

FRONT LEVER

BENCH Punches

This handy, sturdily made

bench punch features:

1. A punch and die which cannot lose alignment.

2. Efficient one man operation with full view of work at all times.

3. 65 standard sizes of round, flat, oval, and square punches and dies.

Capacity: $\frac{7}{16}$ " through $\frac{1}{4}$ " or equal

Immediate shipment

SEND FOR CATALOG SHEETS ON OUR
COMPLETE LINE OF METAL-WORKING TOOLS.

T. H. LEWTHWAITE MACHINE CO.

317 East 47th St. • New York 17, N. Y.



For more data circle 615 on Reader Service Card

modern machine shop 309

**NEW MODELS ADDED TO
DOUBLE REDUCTION SPEED**

NOW

2-DIMENSIONAL PROFILING ON ANY VERTICAL MILLER!



WITH THE NEW

REGENT R-200

FLUID MOTION

DUPLICATOR TABLE...

Fastest method of Profile Milling

Tighten just 4 bolts and R-200 is mounted on any vertical miller! It combines all the extreme sensitivity of true fluid motion with the extra rigidity of its base-casting-mounted follower arm.

Single lever control enables inexperienced operators to produce intricate contoured parts. Rugged adjustable friction brake. Table "floats" on ball-bearings in circular raceways.

Capacity: 6" x 6"
1 to 1 ratio with master

**WRITE FOR
LITERATURE**

J. M. Kalins & Co.

1575 Railroad Avenue, Bridgeport 5, Conn.

For more data circle 616 on Reader Service Card

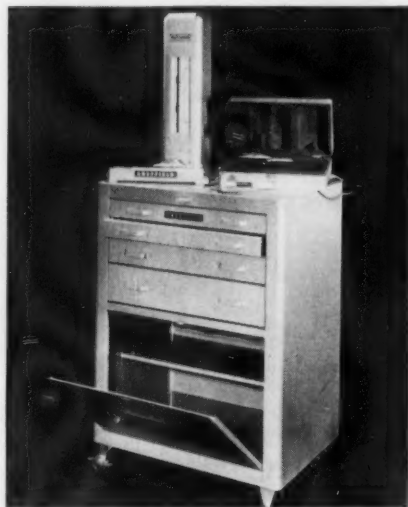
310 modern machine shop

new shop equipment . . .

GAGE CART MAKES AIR GAGING MORE PORTABLE

The Sheffield Corp., Dayton 1, Ohio, has developed a gage cart to house and transport the Precisionaire air gage and related tooling compactly and efficiently. It has room on its 26½ by 18½ top to accommodate both the single column gage and adjustable tooling suited to a variety of gaging operations. Oversize casters make the cart easy to roll by hand. The cart's top provides supplementary bench space and the bottom compartment can be enlarged by removing its center shelf to install a small compressor and make the cart self-sufficient for gaging in departments or plants where there is no accessible source of compressed air. The cart's four drawers can store adjustable tooling, masters, gage blocks, air hoses and various other items.

For more data circle 160 on Reader Service Card



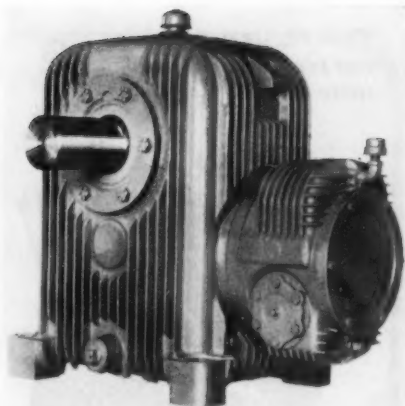
Sheffield Gage Cart has four drawers

August, 1957

NEW MODELS ADDED TO DOUBLE REDUCTION SPEED REDUCER LINE

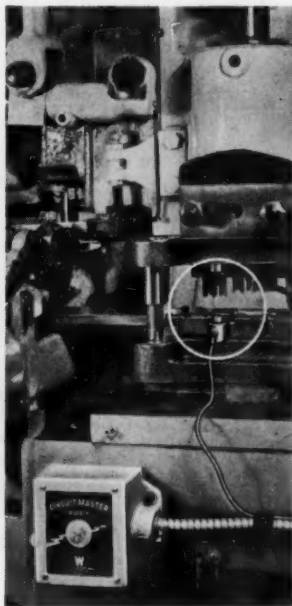
Four new and improved standard primary double reduction units have been developed and added to its line of Cone-Drive Double Enveloping Worm Gear Speed Reducers. Available from stock from Cone-Drive Gears Division, Michigan Tool Co., 7171 East McNichols Rd., Detroit 12, Mich., the primary units are available in center distances of 2, 2½, 3 and 3½ inches. Coupled with the proper secondary, they provide reductions from 25:1 to 3,500:1.

These models not only provide an extremely wide range of torque and reduction combinations, but are available with worm over or under, or gear shaft vertical in either right or left hand or double extended shaft assemblies to meet almost any installation requirement. Primary units from 2



Michigan Model UU-77600-C Speed Reducer

through 3 inch center distance consist of new standard housings containing standard gearsets, bearings, caps and so on. Secondaries for these units are standard speed reducers using stand-



New low cost die protection with **CIRCUIT MASTER**

- Shuts down automatic power presses before dies and tools are broken
- Completely automatic
- No adjustments
- No operator supervision
- No maintenance
- Simple installation

The revolutionary new mechanical-electronic control . . . CIRCUIT MASTER stops any automatic press on first contact with overloads due to jams, improper feeding, freezing of parts, pile-ups, oversized stock, buckling, double thickness, etc.

Unlike microswitches, fingers, etc. which are sometimes used to protect specific sections of the die and require constant adjustment, the CIRCUIT MASTER will protect the entire die.



Write for complete technical data. Application engineering service on request. No obligation. U. S. and Foreign Pat. Pending

WINTRISS, INC.

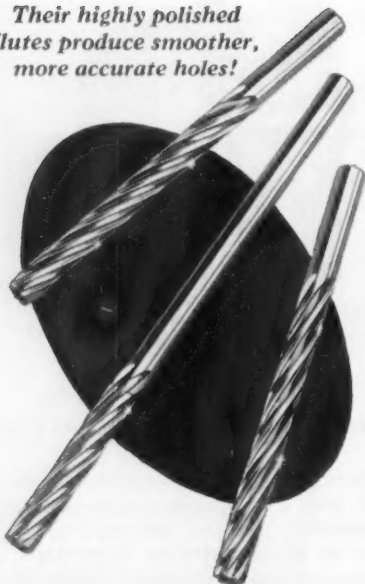
20 Vandam St., N. Y. 13, N. Y. CHelsea 2-0105

For more data circle 618 on Reader Service Card

August, 1957

modern machine shop 311

*Their highly polished
flutes produce smoother,
more accurate holes!*

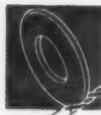


ACE

Drill Length and Chucking REAMERS

For the finest reamers that money can buy, always specify "ACE"! They're made of top quality, pre-hardened high speed steel and produced by the Ace-originated "ground-from-the-solid" process. Results? Stronger, more highly polished right hand spiral flutes. Keener, longer lasting cutting edges. Plus smoother, more accurate holes at lower cost!

Call your local Ace Drill Distributor today!



ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

For more data circle 619 on Reader Service Card

312 modern machine shop

new shop equipment . . .

ard stocked components. Water cooling coils can be installed in all sizes above 3 inch center distance for increased capacity. Primaries and secondaries are independently lubricated and have individual breathers, fillers and oil level gages.

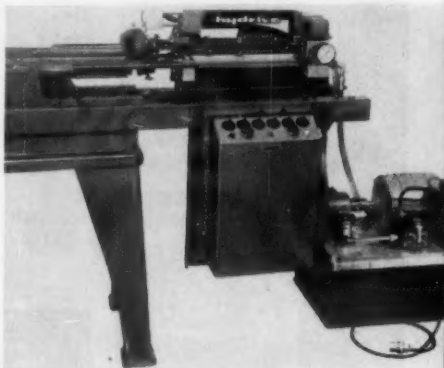
For more data circle 161 on Reader Service Card

★ ★ ★

TURRET DRIVE FOR POWERING SELF-INDEXING LATHES

Acme Industrial Co., 204 North Laflin St., Chicago 7, Ill., has introduced its Acme Hydrive, which is a hydraulically operated turret drive for powering self-indexing lathes from bench size up to No. 5 turret lathes. Also, Hydrive is claimed to improve the quality and finish of parts and to reduce the number of rejects.

The unit is used to automate the turret, feed the cross slide, change the spindle speed, advance bar stock, reverse direction of spindle rotation for tapping and open and close collet.



Acme Hydrive — a hydraulically operated turret drive applied to self-indexing lathe

August, 1957

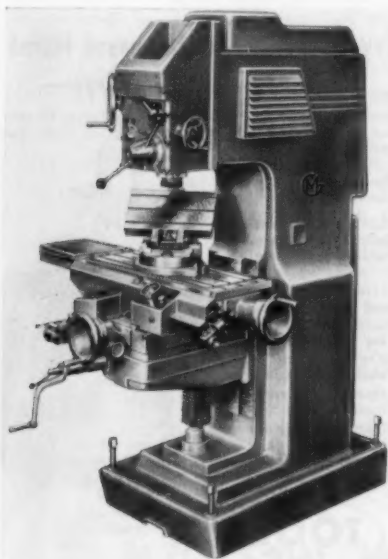
Acme Hydrive reduces operator fatigue and makes it possible for one man to handle two machines or check and inspect parts while the lathe is running. The hydraulic operation of the machine is said to result in steady, direct motivation.

For more data circle 162 on Reader Service Card

★ ★ ★

JIG BORER HAS OPTICAL READINGS IN TENTHS

Triplex Machine Tool Corp., 75 West St., New York 6, N. Y., is now marketing the Triplex-Matheys Model 35-NC Jig Borer. The work table of this machine can be positioned longitudinally and crosswise in accordance with readings in 0.0001 inch increments by optical setting devices scanning precision scales located in the saddle and knee. The table size is 33½ by 12 inches. The table movements



Triplex-Matheys Model 35-NC Jig Borer

August, 1957

Another

VICTOR VALUE

Top Quality
Lowest Prices

Our Special Import . . .

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
¼	\$ 6.00	\$ 2.85
½	12.00	5.00
¾	21.00	7.50
1	30.00	10.25
1½	54.00	15.00
2	75.00	20.00
2½	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate
Delivery From Stock!

VICTOR

MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

Dept. B, 251 Centre St.

Tel.: CAnal 6-5575, New York 13, N. Y.

For more data circle 620 on Reader Service Card
modern machine shop 313

new shop equipment . . .

are 21½ by 12¼ inches. Lead screw nuts are adjustable.

The spindle is driven by a 2½ h.p., a.c. motor with infinitely variable spindle speeds ranging from 96 to 1,720 r.p.m. The spindle has a No. 30 A.S.A. taper and quick acting tool retainer nut. Power feed at three rates is provided for 5½ inch boring depth.

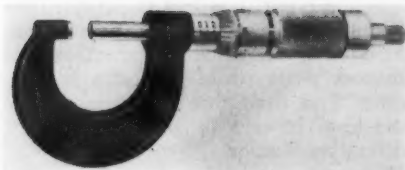
The machine can be equipped with coolant system, machine light fixture, optical centering device and a variety of vises and other devices.

For more data circle 163 on Reader Service Card

★ ★ ★

MICROMETER CALIPER

Twelve high quality, low cost micrometer calipers were recently introduced



Brown and Sharpe Micrometer Caliper

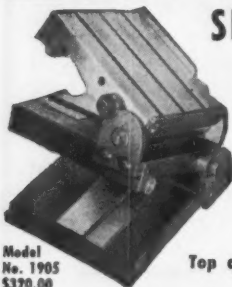
ed by Brown and Sharpe Manufacturing Co., Providence, R. I. These fine precision tools have a black frame finish and are available either with or without clamp ring in both plain and ratchet stop styles. The range is 0 to 1, 1 to 2 and 2 to 3 inches by 0.001 inch. For more data circle 164 on Reader Service Card

★ ★ ★

CENTER LOCATING TOOL

Opto-Metric Tools, Inc., 137 Varick St., New York 13, N. Y., is now

NEW compound angle SINE PLATE



Fast, accurate set-ups for compound or single angles.

- .2000" recesses for small angles
- Heavy duty fences
- T slots for clamping
- Lock on each axis
- Solid oak case

Top quality material and finish

Model No. 1905 \$320.00

Accurate to .0002" in dimensions and parallelism. Roll diameters ± .0001". Top plate 6¼" x 6¼", base 7" x 8". Positive locks hold unit rigid. A high quality compound angle sine plate at LOW COST.



Write for free literature and prices. Order from your dealer or direct.

Bald Eagle Corporation

(Formerly Bald Eagle Tool Co.)

356 Cedar Street • St. Paul 1, Minn.

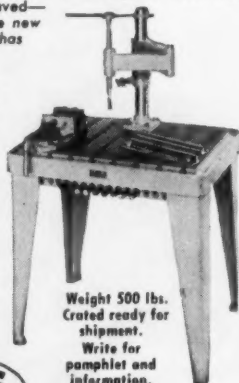
For more data circle 621 on Reader Service Card

314 modern machine shop

Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—it will stay there! The new Allman hand tapper has these advantages:

- Articulate arm swings clear of large table for placement of work.
- Limitless number and sizes of tapped holes without moving work piece.
- Vise holds work as small as ¼" square.
- Floating top locates itself in hole.
- Individual spindle holds taps, thus change requires only seconds.



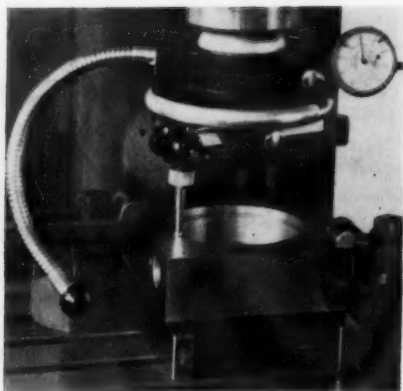
Weight 500 lbs.
Crated ready for shipment.
Write for pamphlet and information.

TOOLS, INC.

1734 No. 25th Ave. • Melrose Park, Ill.

For more data circle 622 on Reader Service Card

August, 1957



Centricator Center Locating Tool in use

marketing the Centricator Tool which is used for truing bores and external diameters in setting-up operations on jig borers, milling machines, and vertical and horizontal boring mills. The Centricator Tool Dial Gage remains stationary in a position selected and preferred by the operator for maximum convenience and speed. In addition thereto the slide in which the contact tip pivots, is readily adjustable between $5/64$ to $11\frac{3}{4}$ inch inside and 0 to $11\frac{3}{4}$ inch outside diameters. The Centricator is furnished with a complete set of universal equipment, consisting of five assorted contact tips, one extension, flexible supporting arm and hardwood case.

For more data circle 165 on Reader Service Card

TAPER SHANK, WIRE GAUGE AND LETTER SIZE DRILLS

Whitman and Barnes, 40050 Plymouth Rd., Plymouth, Mich., has announced a series of high speed taper length drills featuring Fastwist flute construction. Being the Fastwist type, these tools are recommended for drilling aluminum, magnesium, copper, die



High Precision COMPAC

Bore Gage

SWISS MADE

- Four Gages to cover range from .270" to 12"
- .0001" Graduation
- Carbide tipped
- Adjustable depth stop
- Shock resistant indicator

Sales, parts and Service:

BOREL & DUNNER

19313 FARMINGTON ROAD, DEPT. B
LIVONIA • MICHIGAN

For more data circle 624 on Reader Service Card

For Your Convenience...

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 322, 324, 326, 328 and 330.)

MODERN MACHINE SHOP

431 MAIN STREET • CINCINNATI 2, OHIO

August, 1957

modern machine shop 315

Bill Jackson came home from the Air Force, skilled in the tools of modern airpower...



DRILLS

from 2 to 7 holes

TAPS

from 2 to 7
different sizes
in one chucking

ARBO-2
automatic indexing
turret type multi-
spindle drill head

**JEMCO'S ARBO-2 fits any
single spindle vertical drill press**

all operations completed with one chucking — no
reversing of drill spindle necessary for tapping —
speeds changed quickly — reduces machining time —
tapping capacity 1/8 to 9/16-drilling capacity 0 to
1 9/32

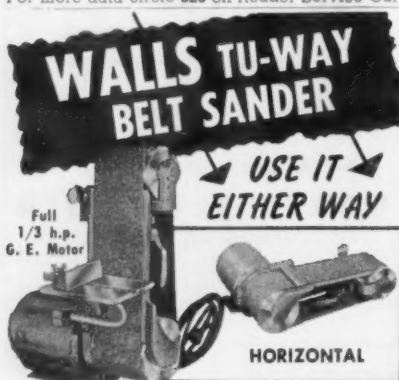
EXCLUSIVE TERRITORIES OPEN

write for complete information to . . .



Jersey manufacturing co.
401-C LIVINGSTON ST. • ELIZABETH, N. J.

For more data circle 625 on Reader Service Card



Full
1/3 h.p.
G. E. Motor

**USE IT
EITHER WAY**

HORIZONTAL

VERTICAL

At last, a top quality industrial sander that
provides all the most wanted **\$89.95**
features — yet sells for so little.

complete with cord, plug, switch ready to use

Illustrated Literature on Request

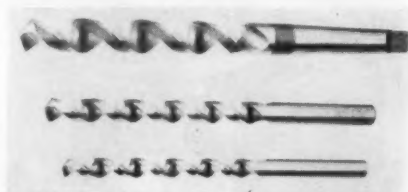
A few desirable distributor
territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 626 on Reader Service Card

316 modern machine shop

new shop equipment . . .



View of Whitman and Barnes Fastwist Drills

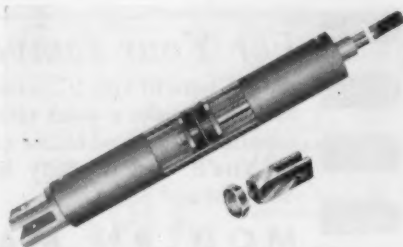
cast metals, some of the plastic materials, slate and marble. According to the manufacturer, excellent service can be given on taper shank sizes 1/8 to 3/4 inch; straight shank taper length wire gauge sizes 1 to 60 and straight shank taper length letter sizes A to Z.

For more data circle 166 on Reader Service Card

★ ★ ★

CYLINDERS WITH FORK REAR HEAD MOUNTING

The A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y., has announced, under its AllenAir trademark, two lines of cylinders, known as Types AN and BN. Both models feature a fork type rear head for mounting, stainless steel rods, Nylined bearings, high tensile aluminum heads, honed brass or steel tubing treated for corrosion resistance and a choice of



AllenAir Cylinder with fork type rear head

August, 1957

**HERE'S
BILL JACKSON
... A SUCCESS
TWO WAYS!**

Bill Jackson came home from the Air Force, skilled in the tools of modern airpower . . .

Bill found a job in the building industry. His progress has been steady . . . the last house he built was his own!

Somehow, though, he felt something was missing. Maybe it was the powerful roar of an engine run-up . . . or how it feels to talk airman's talk . . .

Maybe it was that sense of "belonging," of being part of a fine group of guys working together on a great Air Force team . . .

Then he joined the Air Force Reserve!

Now he's part of the team again . . .

Content that he's doing *two* big jobs . . . happy to be among those trained Air Force veterans who stand ready to lend a hand in the business of defense.

For information about **YOUR** place in the
Air Force Reserve, call, write or visit your local Air Reserve Center



**PRESENTED AS A PUBLIC SERVICE BY
MODERN MACHINE SHOP**



new shop equipment . . .

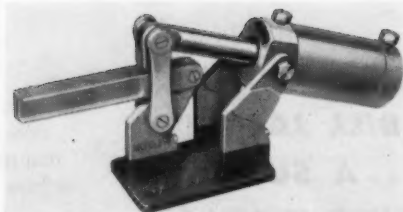
fixed or adjustable cushions for either end or both. The bore sizes available are $\frac{7}{8}$, $1\frac{1}{8}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3 and 4 inches. Type BN Cylinders use cups for the piston head seals, instead of the O ring packing used on the Type AN. Double packing for the rod gland is also provided on the Type B. All cylinders are available as double acting or single acting spring return.

For more data circle 167 on Reader Service Card

★ ★ ★

AIR OPERATED TOGGLE CLAMP

Detroit Stamping Co., 349 Midland Ave., Detroit 3, Mich., has announced an air operated toggle clamp giant, which has been developed for especially rugged, tough and demanding work holding assignments. It weights 16 pounds, has an overall length of $15\frac{7}{8}$ inches (closed), a height of $7\frac{1}{4}$ inches and delivers holding pressures up to 2,000 pounds with normal air line pressure of 90 pounds. Both the clamp and the mounting base are equipped with hardened bushings and pivot rods. Other features include: all components individually replaceable; solid forged work holding bar; both clamping and unclamping triggered by air pressure; and utmost compactness considering its strength and ruggedness.



De-Sta-Co Model 858 Toggle Clamp-omatic

Model 858 De-Sta-Co Air Operated Clamp-omatics are especially recommended for multiple split second positive clamping. De-Sta-Co Valves and Air Hose Kits are available for use with Clamp-omatics.

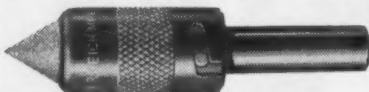
For more data circle 168 on Reader Service Card

★ ★ ★

BARREL FINISHING EQUIPMENT

Casalbi Co., Globe Division, 543 Wayne St., Jackson, Mich., recently introduced its Globe Series 3000 Burr-Rite, Sr. Tumbling Barrel. It has been designed for small to medium large production runs. For production involving the finishing of metal, plastic or rubber parts, it is said to assure time and money savings. It will handle medium quantity runs that would otherwise tie up larger equipment. This tumbling barrel affords the advantage of doing up to four operations at one time, or process up to four large precision parts at one time in

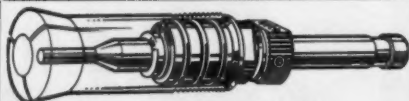
ABRASIVE CENT-R-LAP TOOL



Saves time, eliminates diamond dressing. Cones changed in seconds. Available in three sizes: $\frac{3}{8}$ ", $\frac{3}{4}$ " and $1\frac{1}{2}$ " Cent-R-Laps and abrasive cones in leading grits. Write for descriptive literature and prices. Sold to consumers only.

J. R. REICH MANUFACTURING CO.
201 E. Stroop Rd. Dayton 9, Ohio

For more data circle 628 on Reader Service Card



NEW! Self-Centering 5C Collet Stop

Quick friction adjustment. Stays in fixed position. Will not distort collet. Will not move back. Also available for other collets and spindles.

Write for Bulletin.

BYCO INDUSTRIES

2200 Snelling Ave. Minneapolis 4, Minn.

For more data circle 629 on Reader Service Card

**NOW . . . unlimited
FLEXIBILITY!**

Designed for **HIGH PRECISION**
light machining within .0005"
overall accuracy

PAMA

**HORIZONTAL
BORING, MILLING
& DRILLING MACHINE**

Model #AL-55

**Hardened &
Ground Gears**

**14 Speeds
17-1500 rpm**

**2" Spindle
Hardened & Ground**

**Vertical Movement
Synchronized
with Head**

**20" Spindle
Travel
24" Vertical
Travel to Head**

**Built In Rotary
Table, 26" x 26"
Power Driven**

- power feed in all directions
 - rapid traverse
 - optical measuring system available
 - thread cutting attachment available
- Complete with standard equipment
price **\$10,920**



DEALER INQUIRIES INVITED

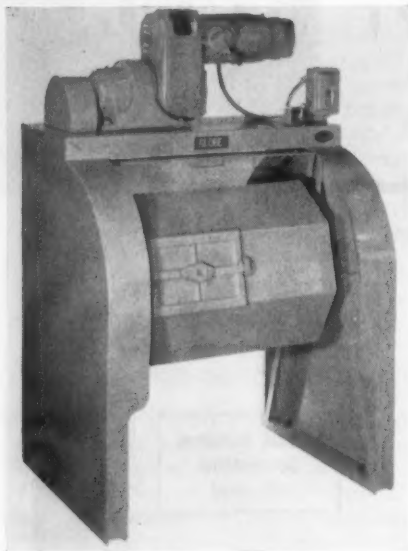
Send for full information to: Dept. M,
MASERATI CORP. OF AMERICA
46 SEA CLIFF AVENUE
GLEN COVE, L. I., N. Y.

For more data circle 630 on Reader Service Card

August, 1957

modern machine shop 319

PUNCH PUNCHES AND DIES

new shop equipment . . .

Globe Series 3000 Burr-Rite, Sr. Tumbling Barrel with free swinging safety screen

individual compartments for such processes as deburring, grinding, polishing, burnishing and deflashing.

Features of the Series 3000 Burr-Rite, Sr. include: free swinging safety screen with no troublesome channel which is easily damaged; lightweight aluminum door with quick acting latch to allow fast loading and unloading; 1/4 inch abrasive resistant bonded neoprene lining; manually operated forward and reverse drum switch for easy operation; extra strength A frame design; modern design waterfall front with steel cabinet paneling; and so on. For more data circle 169 on Reader Service Card

★ ★ ★

SMALL PARTS STRAIGHTENER

Cooper Weymouth, Inc., 277 Noble Ave., Bridgeport 8, Conn., has an-

nounced a part and stock straightening unit, which has been designed to obtain maximum flatness in small metal stampings required in high speed production.

This is a bench height, motor driven, self-contained unit for straightening parts that have become distorted during processing. This straightener will bring to extreme flatness (to within 0.001 to 0.002 in most cases) parts as thin as 0.010 and as short as 2 inches on the 6 inch stock width model. Eight and 12 inch stock width models will straighten parts down to 3 inches in length.

These units are carefully made of durable steel; the 17 straightening rolls and two feed rolls are all power driven, with four individual gear trains. A single two point adjustment easily and positively applies and sets the pressure to the top bank of rolls. They have variable speed drives and reverse switches.

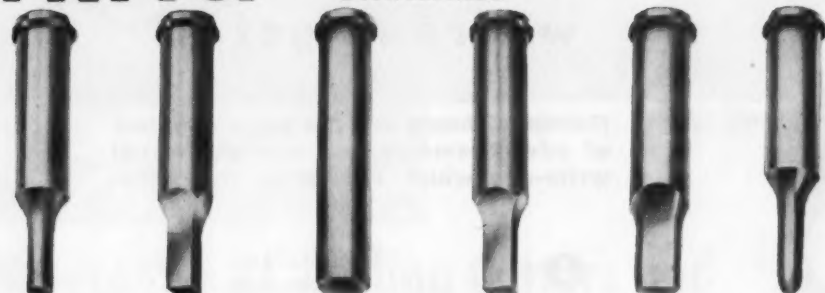
For more data circle 170 on Reader Service Card



Cooper Weymouth Small Parts Straightener

RING PUNCHES AND DIES

STANDARDS



ROUND

SQUARE

BLANK

RECTANGULAR

OBLONG

PILOT



TYPE R DIES



SLUG EJECTOR PUNCHES

HIGH SPEED BEVEL
& SHOULDER HEAD QUILLS

TYPE R DIE



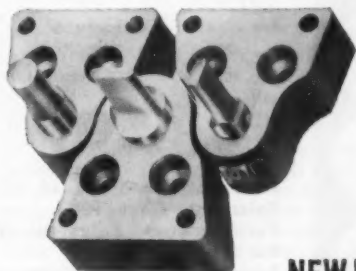
TYPE P DIE

COMPLETELY INTERCHANGEABLE
SHIPMENTS FROM STOCK
CHOICE OF STEELS
HIGH QUALITY
LONG LIFE
LOW COST



SPECIALS

Send prints or sketches for quotation on your requirements. Prompt deliveries—reasonable prices.



NEW!

PUNCH & DIE RETAINERS

Tough alloy retainers accurately machined for Ring Punches and Dies. Ease of mounting saves time and money.

WRITE FOR ILLUSTRATED CATALOG 105

RING PUNCH & DIE, INC.

FENTON PLACE

JAMESTOWN, NEW YORK

For more data circle 631 on Reader Service Card

where
to
get it

where to get it

Numbers shown are the page numbers of advertisements and new equipment write-ups which appear in this issue.

A

Abrasives, Grain, Cloth, Paper, Disc, etc., 50, 51, 59, 183, 193, 196, 197, 325
Accumulators, 246
Actuators, 181
Adapters, 195
Additives, Cutting Oil, 268
Air Operated Equipment
 (Look for specific item)
Alloys, 146, 180
Amplifiers, 267
Angle Irons, 211
Arbors, 202, 290
Assembling Machines, Special, 37, 217
Automated Equipment
 (Look for specific item)

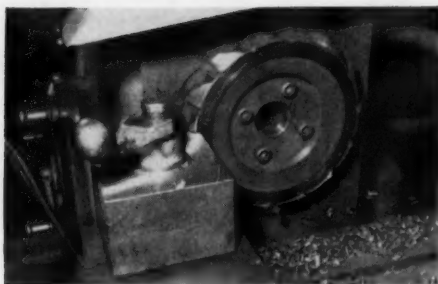
B

Balancing Machines, 14, 15
Balancing Ways, 298
Bar Machines, Automatic, 60
Bar Stock, 180, 331
Barrel Finishing Equipment, 318
Bases, Index, 177
Bearings, Ball, 130, 131, 285, 309
Bearings, Bronze, 261
Bearings, Roller, 130, 131, 285
Bearings, Thrust, 285, 309
Bending Devices, 226, 279
Bending Machines, 248
Bending Rolls, 67
Blades, Carbide, 236, 323
Blades, Centerless Grinder, 180
Blades, Cutting-Off, 81
Blades, Work Support, 129
Blocks, Setup, 271

Blocks, Step, 294, 307
Blocks, Test, 240
Blowers, 304
Bolts, 294, 297
Boosters, 246
Boring Bars, 13, 229, 238
Boring, Drilling and Milling Machines, Horizontal, 56, 319
Boring, Drilling and Tapping Machines, Multiple, 20, 76
Boring Machines, 9, 35, 76
Boring Mills, Horizontal, 74, 75
Brakes, Press and Bending, 43, 52, 165, 254, 276
Broaches, 53
Broaching Kits, 53
Bronze Bars, 261
Brushes, 223
Brushing Machines, 223
Buffers, Bench and Pedestal, 340
Burners, 243
Burs, 260
Bushings, Brass, Bronze, etc., 261
Bushings, Drill Jig, 49, 149, 181
Bushings, Guide Pin, 213
Bushings, Sleeve, 236

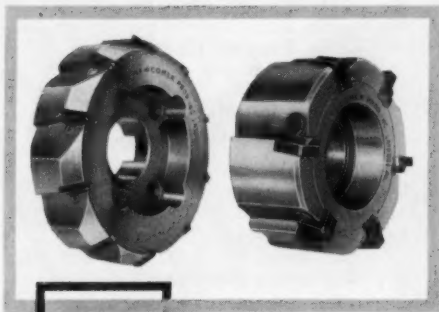
C

Calipers, 241, 263, 314
Cams, 243, 245, 249, 269
Carbides, 28, 29, 180, 221
Castings, 331
Centering Machines, 333
Centers, Bench, 177
Centers, Index, 291
Centers, Lathe, Planer, Miller, etc., 218, 270
Chains, 254
Chamfering Machines, 248
Chasers, 99



Setting a new pace in high speed milling

Newcomer RC Milling Cutters and NP "Throwway" Carbide Blades



New "C"-LOCK
facilitates
indexing...

In one operation after another, Newcomer RC Milling Cutters are setting a new standard for high speed milling . . . a standard that has enthusiastic users reporting increased production at a new low cost!

These new two-piece cutter bodies with distinctive features combine with NP "Throwway" carbide blades to permit heavier feeds and faster speeds . . . eliminate grinding time and costs . . . drastically cut machine downtime . . . and minimize cutter inventories. One cutter body can mill both steel and cast iron by simple use of proper NP carbide grade.

"C"-Lock rigidly holds blade against flat ground seating surface of cutter body. This lock provides quick access to change and indexing of cutter blades with nothing more than a hex wrench. Blade won't move or "work out" during tightening. Indexing is positive . . . accurate!

Contact your local Newcomer representative . . .

Newcomer RC Milling Cutters are available in triangle blade styles for heavy and general purpose milling; or in square blade styles for general purpose and shoulder type milling.



NEWCOMER PRODUCTS, INC.

LATROBE, PA.

Telephone: KEystone 7-5531

GENERAL SALES OFFICE: 512 Franklin Ave., Pittsburgh 21, Pa. Telephone: CHurchill 1-4060

SALES OFFICES LOCATED IN PRINCIPAL CITIES

For more data circle 632 on Reader Service Card

where to get it . . . (Numbers shown are page numbers in this issue)

Chilling Equipment, Industrial, 72
Chip Removers, 299
Chisels, 227, 275
Chucking and Indexing Fixtures,
Combination, 245
Chucking Machines, 27, 88
Chucks, Collet, 99, 246, 263, 266
Chucks, Diaphragm, 176
Chucks, Drill, 263, 279
Chucks, Gear, 216
Chucks, Lathe, 272
Chucks, Magnetic, 219, 259, 282
Chucks, Universal, 303
Clamps, 33, 168, 227, 237, 275, 294, 318
Cleaners, File, 275
Cleansers, Hand, 25
Coil Handling Equipment, 154, 266
Collets, 99, 263
Comparators, 141, 239, 267
Controlling Devices, 256, 294, 311,
335
Convertors, Gas, 240
Coolant Units and Systems, 281, 285
Coolants, 5, 329
Counterbores, 55, 77, 305
Countersinks, 230
Cut-Off Machines, 81, 256, 272, 340
Cut-Off Wheels, 283
Cutters, Deburring, 230
Cutters, Hole, 252
Cutters, Inserted Blade and Tooth, 77
Cutters, Keyway, 297
Cutters, Milling, 26, 235, 251, 308, 323,
333
Cutters, Special, 230
Cutting Compounds, Liquid, 185
Cylinders, Hydraulic and Pneumatic,
168, 246, 283, 316

D

Deburring Machines, 248
Degreasing Materials, 245
Demagnetizers, 269
Diamond Collectors, 302
Die Buttons, 169
Die Heads, 99, 242
Die Making Machines, 31
Die Sets, 6
Dies, Punching or Forming, 8, 180,
236, 254, 321
Dividing Heads, 273, 291
Dressers, Grinding Wheel, 33, 237,
274, 287, 313

Dressing Fixtures, Grinding Wheel,
171, 256
Drill Heads, 184, 222, 276, 285, 316
Drill Rod, 331
Drill Sharpening Fixtures, 239
Drilling Machines, Multiple Spindle,
20, 297
Drilling Machines, Radial, 45
Drilling Machines, Sensitive, 20
Drilling Machines, Turret, 7
Drilling Machines, Vertical, 39, 65
Drilling and Tapping Machines,
Combination, 20, 236
Drilling and Tapping Units,
Combination, 46
Drilling Units, 46, 155, 262
Drills, Center, Core, Twist, etc., 55,
77, 163, 225, 247, 260, 269, 275, 284,
308, 315
Drills, Portable Electric, 193
Drills, Step, 195
Drives, 312
Duplicating Machines, 42, 310
Dust Control Equipment, 182, 200, 340

E

Edge Finders, 276
End Mills, 55, 61, 77, 225, 248, 302
Engraving Machines, 339

F

Feed Units, 37, 154
Files, 61, 230
Files, Oilstone, 325
Filing Machines, 296
Filters, 201
Finishing Machines, 248
Fixture Parts and Fittings, 227
Flats, Glass Optical, 277
Flexible Shaft Equipment, 193
Fluids, Cutting, 185
Flywheels, 202
Forgings, 331
Forming Machines, 58
Furnaces, Heat Treating, 174, 243

G

Gage Blocks, 40, 179, 233
Gages, 82, 225, 233, 235, 257, 264, 265,
289, 304, 315, 333

For Precision Work, nothing equals
the touch of an OILSTONE FILE



Giving gears a new lease on life is a job that calls for an oilstone file. The right shape INDIA file can make this deburring operation a precision job and save hours of precious time.

The "World's largest line of oilstone" offers INDIA and HARD ARKANSAS (for superfine finishing) oilstone files in 35 different shapes and 97 sizes—all described in the Hand Stoning Handbook. For your copy write Behr-Manning Co., Troy, N. Y., Dept. MM-8.



BEHR-MANNING CO.

A DIVISION OF NORTON COMPANY



BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-Cat Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

IS-2

For more data circle 633 on Reader Service Card

August, 1957

modern machine shop 325

where to get it . . . (Numbers shown are page numbers in this issue)

Gears and Gear Units, 54, 251
Germicides, 299
Greases, 273
Grinders, Abrasive Band and Belt, 89
Grinders, Air, 280
Grinders, Bench, 340
Grinders, Carbide Tool, 95
Grinders, Center Type, 10, 11
Grinders, Centerless, 10, 11, 35
Grinders, Chamfer, 255
Grinders, Chucking, 10, 11
Grinders, Cutter and Tool, 42, 141
Grinders, Cylindrical, 35, 50, 51, 196, 197, 325
Grinders, Drill, 141, 239, 255
Grinders, Flute, 255, 269
Grinders, Gear, 35
Grinders, Hand, 155, 280
Grinders, Jig, 8
Grinders, Knife and Shear, 287
Grinders, Pedestal, 340
Grinders, Portable Electric, 193
Grinders, Portable and Tool Post, 155, 340
Grinders, Profile, 35
Grinders, Roll, 10, 11
Grinders, Special Purpose, 35
Grinders, Spline, 35
Grinders, Surface, 10, 11, 30, 40, 41, 93, 141, 152, 183
Grinders, Swing Frame, 251
Grinders, Universal, 10, 11
Grinders, Valve Face, 193
Grinding Compounds, 185
Grinding Fixtures and Attachments, 87, 97, 194, 306, Inside Back Cover
Grinding Wheels, 50, 51, 59, 81, 137, 183, 196, 197, 325

H

Hammers, Hand, 271
Hand Tools, Power
(Look for specific item)
Handles, Machine, 218
Handwheels, 218
Hardness Testing Devices, 63, 188
Hinges, 220
Hobbers, Gear, 159
Hobs, 333

Hoisting and Conveying Machinery, 187
Holders, Floating, 275
Holders, Reamer, 267
Holders, Tap, 267
Holders, Tool, 26, 139, 225, 249, 267, 275
Holders, Work, 212
Honing Machines, 36
Hydraulic Equipment
(Look for specific item)

I

Indicators, 252, 257, 285, 301
Inserts, Carbide, 221, 225, 236

J

Jacks, Leveling, 250
Jig Bore, 39, 136, 206, 286, 313
Jigs and Fixtures, 132, 133, 300


K


Keys, Machine, 268
Keys, Woodruff, 268
Keyway Cutting Machines, 293
Knees, Toolmakers', 211
Knobs, Hand, 218, 294

L


Lapping Machines, 10, 11, 196, 197, 293
Lathes, Automatic, 14, 15
Lathes, Engine and Toolroom, 12, 18, 19, 22, 65, 207, 284
Lathes, Speed, 214, 340
Lathes, Turret, 14, 15
Layout Materials, 239, 243, 273, 300
Leather Cups and Packings, 244
Lighting Equipment, 241, 292
Lubricants, Inside Front Cover, 203, 208, 265, 271, 329

EVER HAVE A MARKING PROBLEM LIKE THIS?

Every day,  engineers accept challenges like this one: designing a machine to mark irregularly shaped parts—clearly, accurately, rapidly, and *automatically*.

The answer was the  unit shown here. It loads for a 30 minute run, automatically turns out accurately marked parts at a rate of 1600 per hour.



For a satisfactory and economical solution to *your* marking problem, consult Geo. T. Schmidt, Inc. Write today for full information, or for consultation with engineers—at no obligation, of course. 

GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue
Chicago 13, Illinois

**"IF
IT'S
WORTH
MAKING,
IT'S WORTH
MARKING."**

For more data circle 634 on Reader Service Card

August, 1957

modern machine shop 327

where to get it . . . (Numbers shown are page numbers in this issue)

M

Magnesium, 132, 133
 Magnifiers, 289
 Marking Devices, 172, 212, 298, 307, 327
 Metallizing Equipment, 191
 Milling Attachments, 24, 69, 234
 Milling Machines, Automatic, 269
 Milling Machines, Bench, 189, 287
 Milling Machines, Horizontal, 35, 42, 69, 80, 84, 85, 86, 301
 Milling Machines, Profile, 204, 234
 Milling Machines, Thread, 333
 Milling Machines, Turret, 24
 Milling Machines, Universal, 80
 Milling Machines, Vertical, 35, 42, 80, 189
 Mills, Midget, 230
 Motors, 335
 Mountings, Machine, 192

N

Nibblers, 62, 235, 301
 Nuts, 64
 Nuts, T, 294

O

Oils, Cutting, 173
 Oils, Grinding, 173
 Oils, Hydraulic, Inside Front Cover, 90, 91
 Oils, Lubricating, 329
 Oils, Soluble, 185
 Ovens, 178

P

Pans, Tote, 268
 Pantographs, 42
 Parts, Machine Tool, Production, Aircraft, etc., 181
 Penetrators, Diamond, Ball, etc., 240
 Pins, Dowel, Taper, etc., 198, 213, 224, 268, 274, Back Cover
 Pipe Fittings, 247, 279
 Planer-Millers, 76

Plates, Angle, 251
 Plates, Sine, 217, 314
 Plates, Surface, 40, 286
 Polishers, Portable Electric, 193
 Polishers, Portable Pneumatic, 23
 Positioning Fixtures and Devices, 233
 Presses, Arbor, 170
 Presses, Forging, 291
 Presses, Hydraulic, 34, 170, 210, 335
 Presses, Power, Front Cover, 38, 208, 231, 242, 270, 278, 290
 Presses, Punch, 44, 306
 Presses, Turret Punch, 153, 281
 Projectors, Profile, 241
 Pumps, Coolant and Lubricant, 194
 Pumps, Hydraulic, 258
 Punches, 62, 169, 212, 231, 236, 275, 321
 Punches, Bench, 309
 Pyrometers, 243

Q

Quills, 295, 321

R

Racks, Machine, 268
 Reamers, 61, 224, 225, 230, 232, 312
 Reels, 154, 226
 Refractories, 50, 51, 196, 197, 325
 Riveting Machines, 78, 216, 286, 309
 Rivets, 78
 Rolls, 180
 Rust Preventatives, 278, 329

S

Sanders, Portable Electric, 193
 Sanding Machines, Belt and Disc, 316
 Saw Blades, Band, 40, 61, 147
 Saw Blades, Hack, 21, 61
 Saw Guides, Band, 241, 250
 Saw Sharpening Machines, 287
 Sawing Machines, Band, 40, 258, 275, 296
 Sawing Machines, Hack, 21
 Saws, Portable Electric, 193
 Scales, 293
 Scrap Removal Machines, 47

233
335
208,

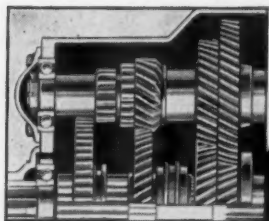
194
275,

2
09

75,

57

GREATER



Macco 472 at both ends positively eliminates the major complaint against using soluble coolants in automatics—the leakage of lubricating oil into coolant sump, and vice versa, causing rust in gear boxes.

AUTOMATIC

PRODUCTION



to use
MACCO 472
at both ends of your
AUTOMATICS

For years, leading manufacturers everywhere have been using Macco 472 emulsified oil as both a gear box lubricant and a cutting coolant. Almost without exception, they report sharply increased production and reduced costs.

You, too, will enjoy important benefits by using Macco 472 at both ends: Longer tool life—Increased spindle speeds and cutting feeds—Cooler operation—Inspection of parts without cleaning—Elimination of chip spinning and oil salvage—Up to 90% reduction in cleaning costs—Reduction of fire hazards and lower insurance premiums—General good house-keeping and a cleaner and more satisfied personnel.

Only a soluble cutting lubricant with the characteristics of Macco 472 should be so used. A minimum of 4000 lbs. per square inch of film strength at a 15 to 1 emulsion, with very little detergency, is required and the emulsion must be stable in every respect.



Macco 472 enables you to grind tools without the sharply defined chip breakers required with oils, due to the elimination of the hot or plastic chip. With the proper amount of coolant, the chip becomes brittle and breaks more easily, assuring longer tool wear. Cratering and breakage are minimized.

•
**For rust-proofing,
investigate
Macco Blucoat or
Macco Anti-Rust**
•

MACCO
PRODUCTS COMPANY

CHEMICAL COMPOUNDS

**To work out this problem, write us
or call a Macco Sales Engineer.**

FOR THE METAL WORKING TRADE—SINCE 1931

9210 SOUTH SANGAMON STREET • CHICAGO 20, ILL.

For more data circle 635 on Reader Service Card

August, 1957

modern machine shop 329

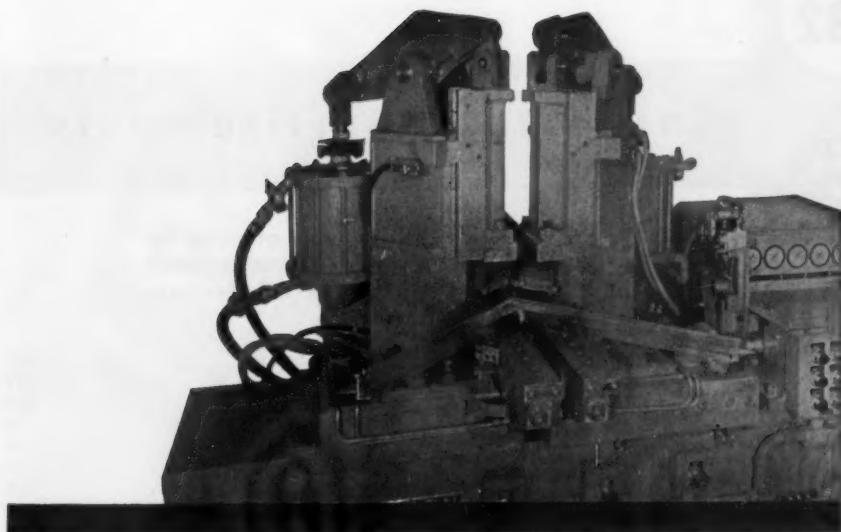
where to get it . . . (Numbers shown are page numbers in this issue)

- Screw Drivers, Portable Electric, 193
 Screw Driving Machines, Power, 37
 Screw Machines, Automatic, 42
 Screws, Cap, Set, Socket, and Machine, 83, 215, 264, 297
 Screws, Transfer, 216, 267
 Scribers, 288
 Segments, Grinding, 183
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 8, 61, 129, 130, 131, 190, 243, 245, 249, 266, 268, 269, 271, 274, 275, 278, 282, 285, 295
 Set-Up Equipment, 234
 Shaper-Planers, 70, 71
 Shapers, 165, 280
 Sharpening Fixtures, 288
 Shearing Machines, 67, 68, 165, 249
 Shearing, Punching, and Coping Machines, Combination, 67
 Shelving, 167
 Shims, 228
 Slotting Machines, 249
 Spacing Collars, 282
 Special Machinery, 8, 217, 291
 Speed Reducers, 251, 311
 Spindles: Grinding, Boring, Milling, etc., 57, 181, 186
 Springs, 218
 Steel, Alloy, 175, 244
 Steel, Die, 32, 40, 61
 Steel, Special Purpose, 175
 Steel, Stainless, 66
 Steel Stock, Ground Flat, 40, 61, 331
 Steel, Tool, 32, 40, 175, 331
 Stops, Collet, 318
 Stops, Die Feed, 232
 Straightening Machines, 154, 320
 Stud Sets, 294
 Stud Setters, 99
 Studs, 294, 297
 Superfinishing Machines, 14, 15
 Surface Finish Standards, 255
 Swaging Machines, 73
- T**
- Tables, Dial Feed, 168
 Tables, Elevating, 161, 289
 Tables, Rotary and Index, 8, 199, 251, 291, 300
 Tables, Work, 303
- Tapes, Pressure Sensitive, 50, 51, 196, 197, 325
 Tappers, Hand, 314
 Tapping Attachments, 263, 276, 299, 337
 Tapping Heads, 184, 222, 276, 286, 299, 316, 337
 Tapping Machines, 20, 157, 228
 Taps, 99, 225, 333
 Taps, Collapsible, 99, 142, 143
 Threading Attachments, 4, 276
 Threading Machines, 220
 Tires, Band Saw, 241
 Tool Bits, 26, 225, 251, 331
 Tool Blanks, 225
 Tools, Balancing, 177
 Tools, Boring, 13, 221, 229, 249
 Tools, Carbide, 61
 Tools, Carbide-Tipped, 180, 225
 Tools, Chamfering, 221
 Tools, Facing, 249
 Tools, Finishing and Sizing, 151
 Tools, Honing, 305
 Tools, Internal Threading, 249
 Tools, Lapping, 318
 Tools, Locating, 314
 Tools, Special Cutting, 55
 Tools, Spotfacing, 55, 77
 Tools, Subland, 163
 Tools, Trepanning, 48
 Transfer Processing Machines, Automatic, 16, 17, 209, 210
 Trucks, 260
 Turrets, Lathe, Tool Post, Bed and Tailstock, 148, 251
- V**
- Valves, 168, 283
 Vise Jaws and Stops, 245, 276
 Vises, Bench and Machine, 33, 79, 220, 237, 263, 277, 278
- W**
- Washers, 294
 Washing Machines, Industrial, 308
 Welding Equipment and Supplies, 239, 253
 Wheels, Band Saw, 241
 Wrenches, 101
 Wrenches, Impact, 193
 Wrenches, Torque, 270

196,

299,

186,



PRK • 33 TOOL STEEL

(Cobalt, High Carbon, High Chrome)

*Holds its edge at 1000° F.!

Above is the Thomson Synchro-Matic Flash Welder performing a miter weld on an aluminum window extrusion. "Pinch-off" dies of PRK-33, a Thomson development, support the work close to the point of weld. After welding, this PRK-33 die moves in to pinch off the flash close to the surface of the work. Eliminating most cleaning and finishing of the weld.

After testing many die steels, Thomson now specifies PRK-33. They have found PRK-33 to be the finest high carbon, high chrome, with cobalt, die steel available. Its production record, its ability to hold a hard edge at high temperatures far surpassed all other die steels tested. Heat treated and double drawn at 980° F. gives PRK-33 a secondary hardness of 59-61 Rc.

Complete Line of high-

est grade Tool Steels, including PRK-33, DARWIN No. 1, NEOR, MINEOR, OHT, "MT6" and various grades of Hot Work Specialty Steels. Furnished in Bar Stock, Forgings, and Sand Castings, Drill Rod, Flat Ground Stock and Tool Bits.

Bulletin on Request.

Want these qualities in the dies you buy?

Write for full information NOW!

DARWIN & MILNER Inc.

highest grade tool steels

2345 ST. CLAIR AVENUE ★ CLEVELAND 14, OHIO

★ 1610 W. FIRST AVENUE ★ COLUMBUS, OHIO ★

REPRESENTED BY

ZIV STEEL & WIRE CO., CHICAGO • DETROIT • ST. LOUIS • INDIANAPOLIS • TOLEDO • MILWAUKEE
• M. G. OPP COMPANY, NEW YORK CITY • PECK STEEL & DIE SUPPLY COMPANY, LOS ANGELES •
CHARLES B. WEBSTER, PLAINVILLE, CONNECTICUT • CHARLES W. BRINGMAN, ORLANDO, FLORIDA

For more data circle 636 on Reader Service Card

index to advertisements

**For listing of products offered by
these advertisers please consult
the "Where To Get It" Section.**

A

Aaron Mchry. Co., Inc.	56, 65
Aber Engr. Wks., Inc.	251
Accurate Bushing Co.	149
Ace Drill Corp.	312
Acorn Bearing Co.	285
Agel Mfg. Co.	200
Albertson & Co., Inc.	193
Allegheny Ludlum Steel Corp.	32
Allen Co., A. K.	168
Allied Products Corp.	169
American Chain & Cable Co., Inc.	
Campbell Machine Div.	62
Wilson Mechanical Instrument Div.	63
American Drill Bushing Co., Inc.	49
Ames Co., B. C.	257
Amitool Co.	136
Anderson Bros. Mfg. Co.	298
Anderson Oil Co., Inc., F. E.	5
Armco Steel Corp.	66
Armstrong-Blum Mfg. Co.	21
Armstrong Bros. Tool Co.	101
Arrow Tool & Reamer Co.	302
Austin Industrial Corp.	80
Auto Moulding & Mfg. Co.	220

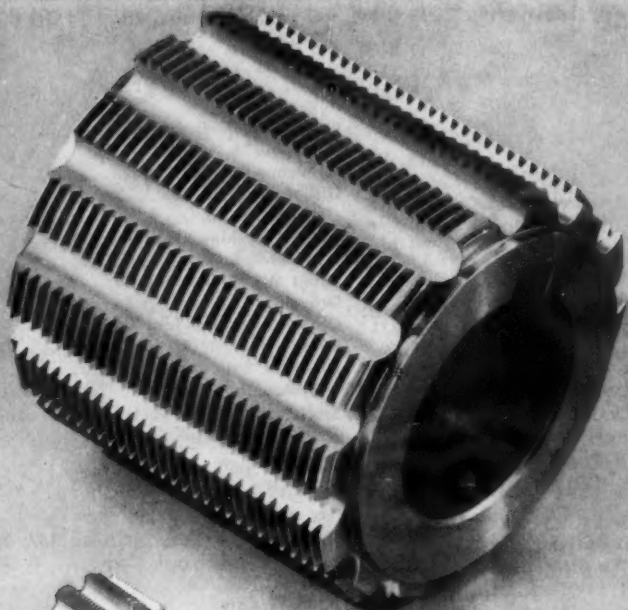
B

B & W Precision Products Co.	195
Bald Eagle Corp.	314
Barco Chemical Products, Inc.	245
Barker Engineering Co.	287
Barry Controls, Inc.	192
Bearings, Inc.	130, 131
Behr-Manning, Div. of Norton Co.	325
Besly-Welles Corp.	225
Beverly Shear Mfg. Co.	249
Black Drill Co.	260

Blake Co., Edward	255
Blanchard Machine Co.	183
Borel & Dunner	315
Bridgeport Machines, Inc.	24
Bryant Mchry. & Engr. Co.	39
Buckeye Tools Corp.	23
Bunting Brass & Bronze Co.	261
Burg Tool Mfg. Co.	7
Byco Industries	318

C

Campbell Machine Div., American Chain & Cable Co., Inc.	62
Capewell Mfg. Co.	147
Carbidie, Inc.	236
Carroll Dividing Head Co.	291
Carter Products Co., Inc.	241
Cerro de Pasco Sales Corp.	146
Chicago Mfg. & Dist. Co.	271
Chicago Quadriil Co.	222
Chicago Rivet & Machine Co.	78
Chicago Tool & Engr. Co.	199
Cincinnati Electrical Tool Co.	340
Cincinnati Gilbert Machine Tool Co.	45
Cincinnati Milling Machine Co.	10, 11
Cincinnati Milling Machine Co., Cincinnati Milling Products Div.	137
Cincinnati Shaper Co.	165
Cincinnati Sub-Zero Products Co.	72
Cincinnati Tool Co.	275
Clark Co., Robt. H.	252
Clark Instrument, Inc.	240
Cleereman Machine Tool Corp.	39
Cleveland Crane & Engr. Co.	68
Cleveland Punch & Shear Wks. Co.	231
Cogsdill Tool Products, Inc.	151
Collis Co.	266
Comet Tool Co.	249
Commander Mfg. Co.	299



MEETING TODAY'S STANDARDS ...AND MORE

To meet the extremely exacting engineered gear requirements of today's industries, Hanson-Whitney has further refined the accuracy standards of fine pitch *ground thread* gear hobs. This H-W advance has been extensively proven and accepted in the highly specialized and complex field.

If you have a fine pitch gear hob problem, Hanson-Whitney has the practical engineering and manufacturing know-

how to provide the solution in a minimum of time and at the most economical cost.

These H-W precision products are typical of the traditional quality and service confidence you gain by specifying Hanson-Whitney as your *complete* threading source. Your local Hanson-Whitney Distributor is ready to assist you in all problems . . . with complete stocks for immediate delivery.

Hanson-Whitney

COMPANY

Division of THE WHITNEY CHAIN COMPANY
173 BARTHOLOMEW AVE., HARTFORD 2, CONN.

TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

For more data circle 637 on Reader Service Card

August, 1957

modern machine shop 333

index to advertisements... (For listings of products consult Where To Get It Section)

Comtor Co.	304
Continental Drill Corp.	284
Cook, Inc., L. H.	271
Covel Mfg. Co.	141
Cross Co.	16, 17
Crucible Steel Co. of America	175
Custom Scientific Instruments, Inc.	285

D

Danly Machine Specialties, Inc.	6
Darwin & Milner, Inc.	331
Davis Keyseater Co.	293
Dayton Rogers Mfg. Co.	190, 300
Dearborn Co., J. W.	245
Dearborn Gage Co.	179
Denison Engr. Co.	335
deSanno & Son, A. P.	81
Desmond-Stephan Mfg. Co.	277
Despatch Oven Co.	178
Detroit Boring Bar Co.	238
Detroit Power Screwdriver Co.	37
DeVlieg Machine Co., Microbore Div.	13
DoAll Co.	40
Dow Chemical Co.	132, 133
Dreis & Krump Mfg. Co.	254
duMont Corp.	53
Dumore Precision Tools	155
Dykem Co.	243

E

Eastern Centerless Grinding Co.	266
Eclipse Counterbore Co.	77
Economy Engr. Co.	303
Edroy Products Co.	289
Eisler Engr. Co., Inc.	243
Electro-Mechano Co.	262
Ellis & Sons, Geo.	239
Enco Mfg. Co.	148
Engelberg Huller Co.	89
Enterprise Machine Parts Corp.	250
Ex-Cell-O Corp.	181

F

Federal Press Co.	208
Federal Products Corp.	264, 265
Fenn Mfg. Co.	73
Field & Son, Inc., W. W.	245
Foot-Burt Co.	41
Fulmer Co., C. Allen	36

G

Galland-Henning Mfg. Co.	283
Gallmeyer & Livingston Co.	93
Gammoss-Hoaglund Co.	224
Gisholt Machine Co.	14, 15
Glover Mfg. Co.	276
Gorton Machine Co., Geo.	42
Govro-Nelson Co.	46
Grant Mfg. & Machine Co.	216
Graymills Corp.	308
Greaves Machine Tool Co.	69
Greenard Arbor Presses	170
Greenlee Bros. & Co.	60
Greenlee Tool Co.	226
Grob, Inc.	296
Gwilliam Co.	309

H

Hamilton Tool Co.	157, 159, 161
Hanchett Magna-Lock Corp.	259, 282
Hanchett Mfg. Co.	287
Hannifin Corp.	210
Hanson-Whitney Co.	333
Hardinge Brothers, Inc.	88
Harig Mfg. Co.	97
Hartmann Mfg. Co.	220
Heald Machine Co.	9
Heimann Mfg. Co.	216
Heller Tool Co.	61
Hercules Precision Granite Surface Plate Co.	286
Hi-Duty Drill Wks.	308
Himoff Machine Co., Inc.	249
Hoggson & Pettis Mfg. Co.	172
Hoglund Engr. & Mfg. Co.	171
Holmes Gage & Development Corp.	267
Holo-Krome Screw Corp.	Fourth Cover
Hones, Inc., Chas. A.	243

I

Industrial Filtration Co.	201
--------------------------------	-----

J

J & S Tool Co., Inc.	33, 231
Jersey Mfg. Co.	316
Johnson Mfg. Corp.	258
Jones & Lamson Machine Co.	99

Plastic Shop reports:
quality up, scrap loss down
with DENISON 1-ton hydraulic
MULTIPRESS

Problem: How to get constant hold-down pressure for foil marking plastic panels and control knobs. The Rohden Manufacturing Company, Chicago, Illinois, was getting too many rejects using air presses for this job.

Solution: They installed a Denison 1-ton hydraulic Multipress — equipped it with the same foil marking head.

Results: Because of uniform ram pressure on the hydraulic Multipress, hold-down of the foil marking head is now identical from piece to piece. Scrap loss is eliminated... output increased substantially to reduce manufacturing cost.

DENISON ENGINEERING DIVISION

American Brake Shoe Co.

1254 Dublin Road • Columbus 16, Ohio



Uniformly marked plastic control knobs turned out quickly, at low cost on a Denison 1-ton hydraulic Multipress with foil marking head.

Manufacturers...

Free 30 day trial

Try the Denison 1-ton hydraulic MULTIPRESS in your plant at no cost or obligation! Write us for details.

Denison, Denison HydrOILics, and Multipress are registered trademarks of Denison Eng. Div., ABSCO



**HYDRAULIC PRESSES • PUMPS •
MOTORS • CONTROLS**

For more data circle 638 on Reader Service Card

August, 1957

modern machine shop 335

index to advertisements... (For listings of products consult Where To Get It Section)

K

Kalins & Co., J. M.	310
Kearney & Trecker Corp.	84, 85
Kennametal, Inc.	221
Keo Cutters	297
Kidde Precision Tool Corp.	245, 271
Kling Bros. Engr. Wks.	67

L

L & J Press Corp.	44
Lamina Dies & Tools, Inc.	213
Laminated Shim Co., Inc.	228
Landis Machine Co.	4
Lassy Tool Co.	212
LeBlond Machine Tool Co., R. K.	18, 19
Lehmann Boring Tool, Div. of Fulton Iron Wks.	229
Lewthwaite Machine Co., T. H.	309
Lincoln Electric Co.	253
Linley Bros. Co.	286
Littell Machine Co., F. J.	154
Lodding, Inc.	227
Lodge & Shipley Co.	52
Lovejoy Tool Co.	202
Lubriplate Div., Fiske Bros. Refining Co.	203
Lucas Machine Div., New Britain Machine Co.	74, 75
Lucas & Son, Inc., J. L.	268

M

M.B.I. Export & Import, Ltd.	263
M & G Instrument Co.	301
Macco Products Co.	329
Machine Tool Publications	275
Madison-Kipp Corp.	280
Manhattan Supply	290
Maserati Corp. of America	319
Mattison Machine Wks.	152
May-Fran Engr., Inc.	47
Metal Carbides Corp.	180
Metal Cutting Tools, Inc.	55
Metallizing Engr. Co., Inc.	191
Metallurgical Products Dept. of General Electric Co.	28, 29
Michigan Tool Co.	54
Miller Fluid Power Div., Flick-Reedy Corp.	246
Mohawk Tools, Inc.	163
Montgomery & Co., Inc.	296

Morris Co., Robt. E.	86
Moyle & Merryweather Mchry. Co.	209
Mummert-Dixon Co.	251

N

National Acme Co.	142, 143
National Automatic Tool Co.	20
Nebel Machine Tool Corp.	22
Neise, Karl A.	241, 249, 271, 279
New Britain Machine Co., Lucas Machine Div.	74, 75
New Hermes Engraving Machine Corp.	339
Newcomer Products, Inc.	323
Nichols-Morris Corp.	273
Nielsen, Inc.	270
Nielsen Tool & Die Co.	267
Nilson Machine Co., A. H.	58
Northwestern Tool & Engr. Co.	294
Norton Co.	50, 51, 196, 197
Numberall Stamp & Tool Co.	307
Nu-Tangs, Inc.	278

O

O.K. Tool Co., Inc.	26
Octagon Process, Inc.	278
Ohaus Scale Corp.	293
Oliver Instrument Co.	31
Olson Industrial Products Co.	251
O'Neil-Irwin Mfg. Co.	153
Onsrud Machine Wks., Inc.	87
Opto-Metric Tools, Inc.	267
Osborn Mfg. Co.	223
Ottmiller Co., Wm. H.	297

P

Peaslee Metal Products Co.	274
Penniman, Elisha	269
Pines Engr. Co., Inc.	248
Porter Machine Co.	274
Pratt & Whitney Co., Inc.	232, 233, 234, 235
Precise Products Corp.	295
Procurier Safety Chuck Co.	337
Pyrometer Instrument Co.	243

R

R & A Machine Co., Inc.	306
Reich Mfg. Co., J. R.	318

a PROCUNIER TAPPER pays for itself!

**Built-in features and operating advantages
increase production—reduce costs!**

Any way you look at it—you save and gain with Procunier Tappers. It is an uncontested fact, when you use Procunier you are enjoying the advantages of the finest tapping heads. Countless reports indicate tremendous savings on taps, automatic production increases, drastic reduction in parts spoilage, less operator fatigue, fewer "down hours" and precision accuracy in threads and tapped holes. Taking these gains and savings into consideration you can quickly see why Procunier heads "pay for themselves in just a short time!"

Procunier heads offer high speed, quiet operation, a new, powerful drive—with finger tip pressure; economical lightness, "long life" ruggedness and an accuracy and dependability you can consistently count upon! And, there's a versatile model for practically every tapping operation.

Send for FREE Brochure

Find out how you, too, can benefit with Procunier. Get the full construction details—see the many unusual tapping applications—get the "inside story" on why Procunier has led the field for more than 30 years. Write today—now.



**MAIL
COUPON
TODAY!**

PROCUNIER
Safety Chuck Co.
12 S. Clinton St.,
Dept. 8
Chicago 6, Illinois

PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, Ill. Dept. 8.

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

City.....Zone.....State.....

Name.....

Address.....

For more data circle 639 on Reader Service Card

August, 1957

modern machine shop 337

index to advertisements... (For listings of products consult Where To Get It Section)

Reid Tool Supply Co.	218
Richards Co., J. A.	279
Ring Punch & Die Co.	321
Rivett Lathe & Grinder, Inc.	12
Robbins Co., Omer E.	217
Roberts Rubber Co., Weldon	59
Rockford Die & Tool Wks., Inc.	288
Rockford Engineered Products Co.	278
Rockford Machine Tool Co.	70, 71
Rodgers Hydraulic, Inc.	34
Rowbottom Machine Co.	269
Royal Oak Tool & Machine Co.	Third Cover
RoyEL Tools	267
Ruthman Mchry. Co.	194

S

Sal Metal Products Co.	268
Sales Service Machine Tool Co.	38
Savage Co., W. J.	301
Schauer Mfg. Corp.	214
Scherr Co., Inc., Geo.	239, 241
Schmidt, Inc., Geo. T.	327
Scully-Jones & Co.	139
Service Machine Co.	242
Severance Tool Industries, Inc.	230
Sheffield Corp.	57
Sheldon Machine Co., Inc.	207
Shell Oil Co., Inc.	90, 91
Simplex Machine Tool Corp.	76
Smith, F. E.	194
Smith & Sons, Inc., G. W.	239
Somerset Tool Co.	274
Spellman Co., R. L.	212
Sperman Metal Specialties	256
Standard Die Set Mfgs., Inc.	273
Standard Electrical Tool Co.	186
Standard Horse Nail Corp.	198
Standard Pressed Steel Co.	64, 83, 167, 215
Standard Steel Specialty Co.	268
Stevens, Inc., John B.	291
Stuart Oil Co., D. A.	185
Sturtevant Co., P. A.	270
Sun Oil Co.	173
Sundstrand Machine Tool Co.	177

T

Taft-Peirce Mfg. Co.	82, 211
Tamm Industries, Inc.	273
Texas Co.	Second Cover
Thermo Electric Mfg. Co.	174
Thompson Grinder Co.	30

Thriftmaster Products Corp.	276
Tools, Inc.	314
Tool-Craft Co.	251
Torit Mfg. Co.	182
Torsion Balance Co.	188
Trico Fuse Mfg. Co.	281
Troyke Mfg. Co.	300
Tru-Seal Div., Flick-Reedy Corp.	247
True-Trace Sales Corp.	256

U

U. S. Burke Machine Tool Div.	189
U. S. Drill Head Co.	184
Up-to-Date Tool Co.	239

V

Van Norman Machine Co.	35
Verson Allsteel Press Co., Inc.	First Cover, 43
Victor Mchry. Exchange, Inc.	313
Vimco Mfg. Co.	292
Vogel Tool & Die Corp.	272
Vulcan Tool Co.	8

W

Walker Co., O. S.	219
Walls Sales Corp.	316
Wardwell Mfg. Co.	269
Warner & Swasey Co.	27
Watts Bros. Tool Wks.	269
Weldon Tool Co.	305
Wells & Sons, W. F.	275
Wesson Co.	95
West Chemical Products Co.	25
Wheelock, Lovejoy & Co.	244
Willey's Carbide Tool Co.	129
Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc.	63
Wilton Tool Mfg. Co.	79
Wintriss, Inc.	311
Woodruff & Stokes Co.	48
Woodworth Co., N. A.	176

Y

Yale & Towne Mfg. Co.	187
----------------------------	-----

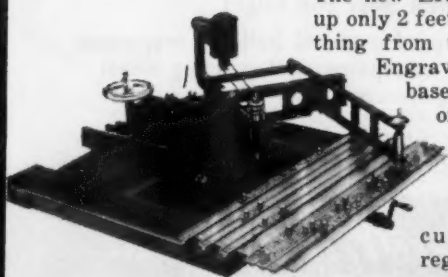
Z

Ziegler Tool Co., W. M.	275
------------------------------	-----

Now — NO plate too small — 213B

NO panel too big

**NO
size limits
on engraving**



The new ENGRAVOGRAPH Model I-R takes up only 2 feet of bench space and engraves anything from tiny nameplates to giant panels.

Engraving chassis can be detached from base and placed directly on workpiece of any dimension. Smaller plates can be easily clamped in a self-centering workholder which is standard equipment. New sturdy pantograph construction; heavy duty cutter spindle; two-way depth regulator.

Send for
booklet FR-1

new hermes ENGRAVING MACHINE CORP.

13-19 University Place, New York 3, N.Y.

August, 1957

modern machine shop 339



18" Grinder
Illustrated

Rugged 5 Ways

WE MANUFACTURE

Speed Lathes
Portable Grinders
Tool Post Grinders
Abrasive Cut-off
Machines
Bench and Pedestal
Buffers
Air Master
Dust Collectors
Bench and Pedestal
Grinders

CHECK THESE ADVANTAGES

- 1** Rugged Motors ($\frac{3}{4}$ H.P. to 10 H.P.)
- 2** Rugged nickel-steel spindle with shaft-locking device
- 3** Rugged wheel guards with exhaust connections
- 4** Rugged grinding rests adjustable to wheel wear and height
- 5** Rugged pedestal built in proportion to horsepower and grinding wheel requirements

Write now for Catalog

TRADE

The Cincinnati

MARK

THE CINCINNATI ELECTRICAL TOOL CO.

304 Mt. Hope Ave.

Cincinnati 4, Ohio

For more data circle 640 on Reader Service Card

340 modern machine shop

August, 1957

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

READER SERVICE CARD

August 1957 issue

RETURN BY OCTOBER 1, 1957 OR
WRITE TO MANUFACTURER DIRECT

Your Name _____

Your Title _____

Company Name _____

Company Address _____

City _____

Zone _____

State _____

Products Manufactured _____

Number of Plant Employees _____

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

431 Main Street
Cincinnati 2, Ohio

modern
machine
shop

EDITORIAL ITEMS										ADVERTISEMENTS									
1	31	61	91	121	151	181	211	241	271	301—Front Cover	435	465	495	525	555	585	615	645	675
2	32	62	92	122	152	182	212	242	272	302—Inside Front Cover	436	466	496	526	556	586	616	646	676
3	33	63	93	123	153	183	213	243	273	303—Inside Back Cover	437	467	497	527	557	587	617	647	677
4	34	64	94	124	154	184	214	244	274	304—Back Cover	438	468	498	528	558	588	618	648	678
5	35	65	95	125	155	185	215	245	275	305	331	357	383	409	435	461	487	513	539
6	36	66	96	126	156	186	216	246	276	306	332	358	384	410	436	462	488	514	540
7	37	67	97	127	157	187	217	247	277	307	333	359	385	411	437	463	489	515	541
8	38	68	98	128	158	188	218	248	278	308	334	360	386	412	438	464	490	516	542
9	39	69	99	129	159	189	219	249	279	309	335	361	387	413	439	465	491	517	543
10	40	70	100	130	160	190	220	250	280	310	336	362	388	414	440	466	492	518	544
11	41	71	101	131	161	191	221	251	281	311	337	363	389	415	441	467	493	519	545
12	42	72	102	132	162	192	222	252	282	312	338	364	390	416	442	468	494	520	546
13	43	73	103	133	163	193	223	253	283	313	339	365	391	417	443	469	495	521	547
14	44	74	104	134	164	194	224	254	284	314	340	366	392	418	444	470	496	522	548
15	45	75	105	135	165	195	225	255	285	315	341	367	393	419	445	471	497	523	549
16	46	76	106	136	166	196	226	256	286	316	342	368	394	420	446	472	498	524	550
17	47	77	107	137	167	197	227	257	287	317	343	369	395	421	447	473	499	525	551
18	48	78	108	138	168	198	228	258	288	318	344	370	396	422	448	474	500	526	552
19	49	79	109	139	169	199	229	259	289	319	345	371	397	423	449	475	501	527	553
20	50	80	110	140	170	200	230	260	290	320	346	372	398	424	450	476	502	528	554
21	51	81	111	141	171	201	231	261	291	321	347	373	399	425	451	477	503	529	555
22	52	82	112	142	172	202	232	262	292	322	348	374	400	426	452	478	504	530	556
23	53	83	113	143	173	203	233	263	293	323	349	375	401	427	453	479	505	531	557
24	54	84	114	144	174	204	234	264	294	324	350	376	402	428	454	480	506	532	558
25	55	85	115	145	175	205	235	265	295	325	351	377	403	429	455	481	507	533	559
26	56	86	116	146	176	206	236	266	296	326	352	378	404	430	456	482	508	534	560
27	57	87	117	147	177	207	237	267	297	327	353	379	405	431	457	483	509	535	561
28	58	88	118	148	178	208	238	268	298	328	354	380	406	432	458	484	510	536	562
29	59	89	119	149	179	209	239	269	299	329	355	381	407	433	459	485	511	537	563
30	60	90	120	150	180	210	240	270	300	330	356	382	408	434	460	486	512	538	564

BUSINESS REPLY CARD

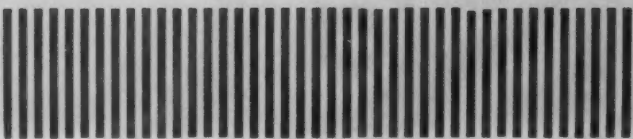
No Postage Stamp Necessary If Mailed in the United States

4 C POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**431 MAIN ST.
CINCINNATI 2, OHIO**

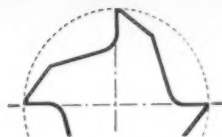
**FIRST CLASS
PERMIT No. 1702
CINCINNATI, OHIO**



For Your Production Cutters— *Relief that will give you longer lasting, better cutting edges!*

Form relief grind for cutting tools has been preferred for more years than we care to remember, yet it has never been practical, except on highly special tools, because of the cost—that is, until R-O came along. Now, on thousands of jobs, step drills, center cutters, reamers, recessing tools, hollow and profiling mills, taps, counterbores and many other standard tools are being made to last longer and perform better by the R-O method. Let us send you complete information.

**GRINDER DIVISION
ROYAL OAK TOOL & MACHINE CO.,
29800 Stephenson Hy., Royal Oak, Mich.**



OLD METHOD



R-O METHOD
more metal to
support edge

RO
UNIVERSAL
FORM RELIEVING
FIXTURE

R-O Grinder



For more data circle 303 on Reader Service Card



WHY HOLO-KROME DOWEL PINS ARE **BLACK**

That black lustre finish on all Holo-Krome Dowel Pins is a double benefit to you . . . *at no extra cost!*

It retards corrosion and rusting of the highly polished surface . . . and the black finish acts as a lubricant.

With H-K Dowel Pins, driving is easier and there's less chance of seriously scoring the pin and mating parts.

For dowel pins with *extras* . . . for dowel pins *individually inspected* . . . the name to remember is HOLO-KROME.



HK . . . First with
Same-Day Service on
All Catalog Items!

HOLO-KROME

HOLO-KROME SCREW CORP. • HARTFORD 10, CONN., U.S.A.

For more data circle 304 on Reader Service Card